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MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—11TH YEAR. SYDNEY: SATURDAY, MARCH 1, 1924. No. 9.

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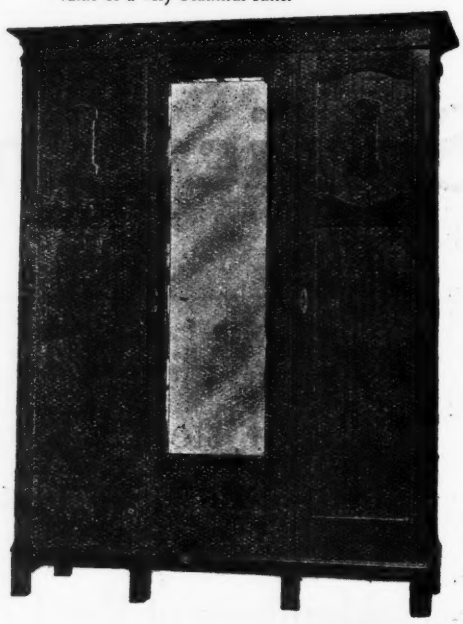

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NEURASTHENIA, HYSTERIA AND EPILEPSY.[1]

By SIR JOHN MACPHERSON, C.B., M.D., C.M. (Edinburgh), F.R.C.P.E.,

Professor of Psychiatry, University of Sydney.

I PROPOSE to introduce to you some patients suffering from neurasthenia and to contrast their condition with that of other patients who are the subjects of hysteria or of epilepsy or both.

Neurasthenia.

The first patient is a man, aged fifty-one years. He is married and follows the occupation of a railway guard. He was admitted to Broughton Hall on September 13, 1923.

His father died at the age of seventy-five years of carcinoma of the stomach. His mother died at the age of seventy-six of "stroke." He has seven brothers and five sisters. There is no history of any constitutional disease in the family. The patient is the eighth in the family. He was a healthy child and at school he was an average scholar. He has worked his way up in the railway service from the position of a porter to that of guard. He married at the age of twenty-two. His wife was twenty-one.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on November 2, 1923.

For many years he has practised *coitus interruptus*. He attributes his illness to this cause. His present illness began five years ago. The first symptom noticed was fatigue. There was inertia in the morning. He awakened from his sleep unrefreshed and felt tired and drowsy all day. He even fell asleep while at work. The second symptom to attract his attention was that he began to feel that his work was too much for him. The third symptom took the form of a loss of confidence in himself. He began to fear being alone and on this account would not take a holiday.

The fourth symptom noticed by this patient was the idea that people were uncivil to him. He imagined that passengers purposely put themselves in his way to annoy him. He has always been able, however, to convince himself that this was a mistake. He was annoyed and irritated with his wife, especially if she had to leave him alone. His fifth symptom was a feeling of nervousness, fear and apprehension that something was about to happen and that his affairs would go wrong. He had a constant fear that he would fail from incompetence, if he were required to undertake any new duty.

Inquiring into his physical condition we find that he is constipated, but that his appetite is good. There is a slight degree of emphysema of his lungs.

His heart is normal. His blood pressure is 161 millimetres of mercury in systole and 108 millimetres in diastole. This is a raised blood pressure. His pupils and vision are normal, as are his reflexes. He complains of pains in his thighs and a wooden feeling in his legs (paræsthesia). He also complains of pains in the calves of his legs. Tactile sensation on the outer aspect of the calves is blunted and abnormal. He experiences palpitation only after exertion. His condition is clearly one of neurasthenia.

The second patient is also a married man. He is thirty-seven years of age. He has no children. He was admitted on April 5, 1923. His father died at the age of fifty years of Bright's disease; his mother is alive, but seems to suffer from some complaint of her liver. One sister died of exophthalmic goître; he has three brothers and three sisters alive and well. He is the eldest of the family. He has been a nervous child and was easily fatigued. He was dull as a school boy and was especially bad at arithmetic. As a child he was moody. His father beat him frequently. He masturbated from an early age until two years ago. He has lived in Queensland on a station and has worked all his adult life in the bush.

At the age of twenty-seven he married a woman younger than himself. He has been sexually impotent or practically impotent on account of *ejaculatio præcox*. He only lived with his wife for a few days after his marriage and has only cohabited with her on rare occasions since. He regrets having married, because he says that he cannot support a home or children. It would have been better for both had they not married. This thought worries him incessantly and has caused his present illness.

His illness began five years ago. He had difficulty in remembering things and numbers. As a result he lost four hundred sheep and was dismissed from his employment. He then experienced great difficulty in making up his mind, even about trifling matters. He became solitary, moody and recluse. He refused to associate or to eat with his fellow employees and preferred to work alone. He was in Sydney at Christmas time in 1922 and was depressed, agitated and distressed. He suffered from severe pains in his head and had feelings of unreality. He had a feeling of personal dissociation. His face and the whole of his body seemed to fade from his consciousness, leaving only his eyes. He could not concentrate on any subject and could not think. The city did not disturb him. At this stage he was taken to a doctor to have psychotherapy, but he proved to be too distressed and to be inaccessible to benefit.

On admission his pulse rate was seventy-two. It was regular. His blood pressure (systolic) was 110 millimetres of mercury and diastolic 76 millimetres. He had frequency of micturition both during the day and during the night time. His testicles were atrophied. He manifested various subjective sensations.

This patient, as may be gathered from the history, is a congenital neurotic subject, perhaps psychopathic. The present crisis is a superimposed manifestation induced by adverse circumstances and his unfortunate marriage. In the circumstances we can only alleviate his symptoms. Of these, those due to very low blood pressure were the most obvious. A low blood pressure of this type is usually accompanied by engorgement of the visceral blood vessels to the derangement of the systematic circulation. It is responsible for the subjective feeling of physical dissociation from which he suffered. We were able by medicinal means to raise the blood pressure to 130 millimetres with a corresponding improvement in the symptoms. He was given liquid extract of ergot, was placed in bed with the foot end raised and compresses were applied to his abdomen.

The two patients I have shown are both neurasthenics. They differ in two important particulars. The first had a comparatively high blood pressure and manifested signs of vagotonia. The second had a low blood pressure, the usual thing in neurasthenia, and exhibited signs of sympathicotonia. In the first the cranial division of the autonomous nervous system was more implicated; in the second the sympathetic division was more implicated. The second important point is that the second patient is a congenital neuropath, while the first is not. That is, the second has always been neurasthenic, while the first patient acquired his malady. Psychologically considered the acute symptoms in both patients were precipitated by conflicts, although the conflicts differ.

Physiologically considered all the symptoms of neurasthenia may be medically and profitably regarded from the standpoint of the autonomic nervous system. The first patient will probably get quite well and resume his occupation. The second will probably never be well, for he has always been ill.

Hysteria and Epilepsy.

The first patient is a single man, aged twenty-six years. He was admitted to Broughton Hall on July 19, 1923. There are no particulars of importance in his family history. He is the youngest of a family of four boys and three girls. He did not have any convulsions in infancy. His first fit took place when he was seventeen years of age; the second took place when he was eighteen, the third when he was eighteen and a half, the fourth when he was twenty and the fifth when he was twenty-four. He was unconscious on each occasion, but the patient did not worry about it. This is an hysterical symptom. He did not pass urine or bite his tongue and he did not suffer from headache afterwards. Some months prior to admission he was engaged in a cold meat store, working on an improvized platform on trestles two metres high. He was handing down frozen carcases of mutton from the chute, when he slipped with the whole sheep in his arms and fell on an upright piece of wood at the end of the platform. He struck his sacrum. He did not lose consciousness, but felt a peculiar cold sensation all over his body. His legs

were flexed of their own accord. His legs and arms ached for three days. He did not eat and lost control over his sphincters. Since the accident he has had numerous fits. As far as we are able to ascertain the fits are the same as before, but he now bites his tongue and passes urine. He has headaches and experiences a "dopey" feeling after the fits. He cannot retain his urine, which dribbles away. For some time after the accident he had no control of the *sphincter ani*, but he has now regained the control. He suffers from impairment of memory. His back and legs are painful and stiff. When he tries to straighten his back he feels sick and faint and gets palpitation. He has had several fits since he has been in this hospital. One of them has been observed. His face was congested, his lips were cyanosed and froth issued from his mouth. Babinski's sign was elicited on both sides, more evident on the left side.

The physical examination disclosed that the apex beat of the heart was diffuse and accompanied by a distinct thrill. There was audible a short presystolic murmur. The systolic blood pressure was 124 millimetres and the diastolic 86 millimetres. The patient was unable to hold his urine either at night or during the day time. He manifested tenderness of his calf muscles. His superficial and deep reflexes were exaggerated.

This is in many respects a highly interesting case. The patient gives a history of fits at first occurring at long intervals—five in seven years. The nature of the fits was indefinite and they were atypical. They appeared to be more like hysterical attacks than true epilepsy. Then there is the accident. Perhaps he had a spinal concussion. Otherwise it is difficult to account for the loss of control over the sphincters. The accident was followed by distinct symptoms of hysterical trauma. It was also followed by a considerable increase in the number of fits. The one fit observed was unquestionably of a true epileptic nature. The other fits or some of them may have been hysterical. Gowers insists on the occurrence of epileptic and hysterical fits in some subjects. This raises the important but unsolved question of the relationship between hysterical and epileptic fits. Can they pass from the one to the other? Can a true epilepsy proceed from hysterical fits? If this patient's original fits were epileptic, they have certainly increased in severity and frequency and their character has become altered since the accident. If they were epileptic, of course, the prognosis is grave and the hysterical symptoms are likely to be severe and prolonged.

Compulsion Neurosis.

This patient is a married woman, aged thirty-four years. She was admitted on October 20, 1922. She has three children; the eldest is ten and a half years and the youngest three and a half years of age. She has a sister who has had a nervous breakdown. She has always been a nervous child; she was afraid of the dark and of being alone, especially at night time. She is a Presbyterian, but when she married a Roman Catholic at the age of twenty-three, she changed her religion. Her confinements have been difficult and have been terminated with forceps. She has had no miscarriages. After the first confinement she had retention of urine. After the second she suffered from varicose veins which burst. After the third confinement she had an attack of influenza. Then things began to go wrong. She became worried and irritable. She could not cope with her domestic duties. One day when she was dusting her room, she found that her duster was dirty. She threw it away and took another. That one, too, became dirty. A week later she imagined that her hands were dirty. She washed them, but they became dirty again at once. Before she did anything, such as making a bed, she had to wash her hands. If she resisted the impulse she experienced a feeling of sickness, faintness and palpitation. This passed off as soon as she washed her hands. She began to fear that she was becoming insane. The obsessions interfered with her work and her life became a burden to her. When she was admitted to the hospital she had a cystitis which was accompanied with great pain. There was blood in her urine. This passed off after treatment. Psycho-analysis was employed and a history of masturbation was elicited.

There is also a domestic worry which aggravates the symptoms of this patient. Her mother-in-law, a bigoted Roman Catholic and an autocratic woman, lives with her and her husband. She worries the patient with her remarks on religion which is a sore point with her.

Under treatment she has greatly improved and was discharged on September 2, 1923, but her stay at home resulted in a relapse. She was re-admitted on September 30. Since then she has again improved. The personal history reveals distinct psychasthenia and neuropathy. At any rate she is now unable to contend with the strain and difficulties of her home environment and is only well when separated from them.

Epilepsy and Hysteria.

The last patient I propose to present to you is a single man, aged forty-two years, an engineer. He was born in England. He had fits up to the age of eight. He had been a delicate child, but a good scholar. In 1917 he came from Canada to Australia and in 1919 he was working at Cockatoo Island. At that time he had a fugue and walked to Manly; here he came to himself. On another occasion he was found walking on a parapet of a dry dock. He was dismissed. He continues to have fugues. He walks to a door and turns the handle. The last fugue was preceded by an epigastric aura. The sensation travels up to his throat and is accompanied by a choking feeling. He then loses consciousness. The choking feeling is *globus hystericus*. Another hysterical symptom present in this patient is hypo-æsthesia, extending over the greater part of the body. It becomes almost anæsthesia in the lower limbs, except the soles of the feet. All the reflexes are dulled. Signs of arterio-sclerosis and of hypothyreoidism are present. The question here again is one of the distinction between epilepsy and hysteria. It is one of great clinical interest.

EARLY ARTERIO-SCLEROSIS.[1]

By JOHN BOSTOCK, M.B., B.S. (London), D.P.M., M.R.C.S., L.R.C.P.,

Resident Medical Officer, Mental Hospital, Callan Park, New South Wales.

THE term arterio-sclerosis is one that has lead to considerable confusion, as used by different authorities. In employing it in connexion with the pathological changes in the three patients of ages twenty-five, twenty-three and twenty-seven to be shown a clinical thickening of the arterial wall is implied, irrespective of demonstrable degeneration.

The first is associated with a normal blood pressure. In the absence of any septic focus or irritant to cause the hypertrophy I beg tentatively to suggest it may be in part the physical expression of "conflicts" occurring in a highly psychotic individual of poor physique. It would thereby fall under the heading psychic stress as a causal agent. Sepsis, however, cannot be entirely eliminated.

The other patients show definite hyperpiesis. In the first a severe attack of pneumonia a few months before admission may have been the cause. There are indications that the bowel is the offending organ of the remaining patient. In both the latter patients there has been distinct degree of confusion and distorientation. Hallucinations have been present. These features have been conspicuously lacking in the patient with normal blood pressure. It is, however, difficult to correlate these findings. Are the arterio-sclerosis and hyperpiesis the cause of the mental confusion or are both conditions produced concurrently by some other agent? To what extent is the psychosis responsible?

The blood of these patients was examined by Dr. Oliver Latham for non-protein, nitrogen urea, uric acid, creatinin and sugar. There was no excess of any of these constituents. Dr. C. H. W. Lawes has examined the urine microscopically and found nothing definitely pathological.

A fourth case has since been added. It falls into the confusional group and shows hyperpiesis in a youth of nineteen years, following on pneumonia.

Case I.

The first patient is a male, aged twenty-five years. He is single; he was born in New South Wales. He is a wheelwright's apprentice.

Family History.

His mother is fifty years of age and is alive and well; no information concerning his father is available. He has two sisters, both alive and well. His two brothers died as babies.

Personal History.

His symptoms date from an operation for hernia in 1919. Afterwards he was "run down and nervy." Later he developed colitis. In 1920 an operation for hæmorrhoids was considered. He took a holiday "for the sake of the anæsthetist." He has since been in the Royal Prince Alfred Hospital and the Grafton Hospital for neurasthenia and psychæsthenic tendencies together with colitis.

He was admitted on August 1, 1923, to Callan Park Hospital as a voluntary patient.

Mental Examination.

He was fully orientated and conscious. According to the result of the Simon test he was a superior adult. He described his affairs with meticulous detail in stilted phraseology. He exhibited logorrhœa. He was not hallucinated. His delusions referred only to his own physical condition; they were of the nature of phobias and obsessions; for example he was frightened that another should catch the disease by drinking out of the same cup. He always had his signature witnessed and the like.

Physical Examination.

The patient was thin and poorly developed. He had some pyorrhœa of his gums and acne on his face. The heart was slightly enlarged and the first sound was impure over the mitral area. The radial and temporal arteries were visible, palpable and tortuous and of small volume. The retinal vessels showed tortuosity. The systolic blood pressure was 120 millimetres and the diastolic was 60 millimetres of mercury. The serum did not yield a reaction in the Wasserman test.

Nocturnal frequency of micturition was present. The urine contained a trace of albumin. Its specific gravity was 1020. It contained neither sugar nor indican.

On examination of the nervous system patchy areas of hypo-æsthesia was detected, which soon cleared up. The superficial reflexes and knee jerks were exaggerated.

The Wassermann test applied to the cerebro-spinal fluid did not yield a reaction.

Treatment.

Iron and arsenic were exhibited. In addition he was given occupational therapy (outdoor work in the gardens) and psycho-therapy on suggestive lines.

Progress.

Great improvement has occurred physically and mentally. He is less worried. The colitis has disappeared. The mannerisms are less pronounced, but are still present. The systolic blood pressure is 120 millimetres and the diastolic ?? millimetres of mercury. The radial arteries are less thickened, but the temporal arteries are still very tortuous and the aortic second sound is accentuated.

Case II.

The second patient is a man, aged twenty-seven, married. He has two children. He was born in England. He is a labourer.

Family History.

His father died of heart disease; his mother is alive and well. There is no insanity in the family.

Personal History.

The patient was well until June, 1923, when he developed pneumonia and pleurisy. In August he became "nervy," was peculiar and detached in manner and had auditory hallucinations. He was "gassed" during the war.

He was admitted on August 31, 1923, as a certified patient.

Mental Examination.

The patient was fully conscious, but disorientated; he knew neither his location nor the date. He made errors of recognition. He had hallucinations of an apparently pleasant nature. He looked about him, started and frowned. Generally he gave the impression of being acutely confused.

Physical Examination.

He was a well nourished man of good physique with hair turning grey. The heart was enlarged to the mid-clavicular line, the aortic second sound was accentuated. The radial arteries were palpable and tortuous. The systolic blood pressure was 160 millimetres and the diastolic 100 millimetres.

The urine had a specific quantity of 1030. It contained neither sugar, albumin nor indican. An occasional hyaline cast was seen. The nervous system showed general hypo-æsthesia to pricks. All the reflexes were dull. No reaction was obtained on two occasions with the Wassermann test applied to the blood.

Treatment.

Small doses of iodides and a morning saline aperient given at first, later *liquor trinitrini*. Meat was excluded from the diet.

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on November 2, 1923.

Progress.

In a fortnight the blood pressure dropped to 153 millimetres. Since then the diastolic pressure has varied between 110 millimetres and 95 millimetres, while the systolic pressure has remained at 145 millimetres. The heart apex beat is within the mid-clavicular line. The radial arteries are less palpable. Mentally, he is now fully orientated and he has lost his hallucinations. Occasionally he has fleeting attacks of confusion. He has suffered with recurrent septic foci on the left arm, for which an autogenous vaccine has been made, but not yet exhibited.

Case III.

The third patient is a single male, aged twenty-three years. He was born in New South Wales. He is a clerk.

Family History.

The family history so far as can be ascertained is good.

Past History.

He had a normal school life, healthy and intelligent. He was quite well until three weeks before admission, when after overworking he had insomnia. He has been a heavy smoker. He denied potus and venereal disease. He was admitted as a certified patient on August 29, 1923.

Mental Examination.

Although fully conscious and orientated, he talked in a rambling despondent manner of the "eternal triangle," "the re-birth of people from one existence to another." He described a feeling of "fear" which he could not understand; he said it was "the bogey man." He denied hallucinations. He complained of often feeling short of breath.

Physical Examination.

He was a poorly developed man of dark complexion. The heart was enlarged to the mid-clavicular line. The sounds were loud but clear. The radial arteries were palpable and tortuous. The systolic blood pressure was 160 millimetres and the diastolic 100 millimetres.

The urine had a specific gravity of 1020. No albumin or sugar were found, but indican was present. There were no casts. The blood serum did not yield a Wassermann reaction.

Treatment.

Meat has been excluded from the diet. Iodides were exhibited and saline aperients and liquid paraffin were given.

Progress.

The systolic and diastolic blood pressures dropped to 135 and 85 millimetres on September 18, and are now 135 and 80 millimetres. The cardiac and arterial systems have shown little change. Mentally there is a considerable improvement, although he is facile; his ideas are less extravagant and his conduct is more reasonable.

Case IV.

The fourth patient is a single male, aged nineteen years, a pattern maker.

Family History.

One brother is an epileptic and two uncles had high blood pressures.

Personal History.

The patient denied venereal disease and potus. He is a heavy smoker.

He was well until seven weeks previously. He had pneumonia, became restless and destructive. Disorientation was a marked feature. Confusion was present. He had visual hallucinations and delusions that he was ordered by God to do certain things. He was admitted as a certified patient on October 26, 1923.

Mental Examination.

Except for slight confusion and disorientation his faculties appeared to be normal. The affective state was slightly depressed.

Physical Examination.

The patient was of moderate physique, fairly nourished. His aortic second sound was accentuated. His radial arteries were thickened and palpable. The systolic blood pressure was 135 millimetres and the diastolic 90 millimetres. The urine had a specific gravity of 1008. It contained a trace of albumin, but no sugar or indican. He had nocturnal frequency of micturition. He complained of excessive thirst. His reflexes were sluggish. No Wassermann reaction was elicited.

Treatment.

Rest, aperients and appropriate diet were ordered.

Progress.

His mental condition appears now to be quite normal. He is fully orientated and the confusion has passed away.

PRELIMINARY NOTE ON A NEW METHOD OF SEROLOGICAL INVESTIGATION IN CASES OF SUSPECTED TYPHOID FEVER.

By F. M. BURNET, M.B., B.S.

From the Walter and Eliza Hall Institute, Melbourne Hospital.

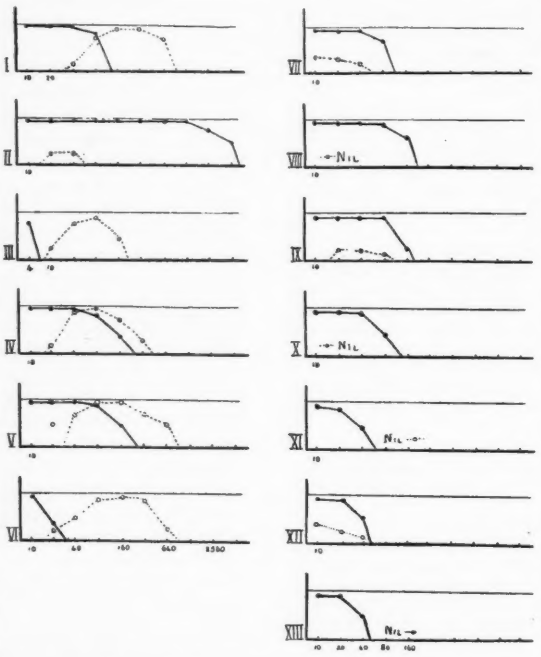
SINCE the widespread inoculation of soldiers and others with prophylactic vaccines against the various forms of enteric fever during the war period, the interpretation of the results obtained by the Widal test has been rendered much more difficult. Even now most of the sera from men who had several doses of typhoid-paratyphoid A and B vaccine, show a titre of from 1 in 40 to 1 in 80 for each of the organisms used, although five or more years have elapsed since the last injection. A pyrexial illness in such a subject, therefore, can only be diagnosed with certainty as typhoid fever when bacilli can be isolated from the blood or discharges. A rising titre of the agglutinating power of the serum suggests that the illness is typhoid fever, but it has been shown that other pyrexial diseases may give a similar rise. As blood culture often fails to reveal the micro-organism even in the early stages of the disease and positive results from examination of urine or fæces are not usually found until fairly late, early diagnosis is difficult in these cases. When, as in this hospital, intravenous therapy is the standard method of treatment, it is important that this should be instituted at the earliest period possible. Any laboratory method which promises to further early diagnosis in such cases, is therefore worthy of thorough trial.

In the present note a method of serological examination is described that has shown a definite and almost constant difference between the sera of patients with proved typhoid fever and of persons prophylactically inoculated with typhoid-paratyphoid A and B vaccines. In all the cases of pyrexial illnesses other than typhoid fever in inoculated men, which have been examined, there has been no appearance of the reaction characteristic of actual enteric fever, nor does such reaction appear during the weeks immediately following inoculation when the agglutinins induced are in greatest amount. It is considered likely that this difference will allow of the early diagnosis or exclusion of typhoid fever in the pyrexial illnesses of vaccinated subjects. No case of proved typhoid fever in an inoculated subject has yet been examined by these methods, such cases naturally being rare in a civil community. Until a number of these

cases has been studied, the absolute diagnostic value of the method must remain *sub judice*. The results obtained so far, however, are felt to be promising enough to justify publication in the hope that pathologists with access to such material may be able to confirm or refute the value of the method suggested.

In brief the test consists in a comparison of the agglutination titres shown by the suspected serum with two different emulsions of *Bacillus typhosus*. One of these was the standard diagnostic emulsion as issued by the Commonwealth Serum Laboratories and the other was prepared as follows: *Bacillus typhosus* was subcultured in normal broth daily for three or four generations and a few drops of a twenty-four hours' culture was used to inoculate forty or fifty cubic centimetres of broth containing 1% of ammonium oxalate at pH. 7.4. After twenty-four hours' growth at 37° C. the culture was centrifugalized. The bacilli were re-emulsified in saline solution (0.85%) containing 0.1% formaldehyde and the emulsion adjusted to standard opacity.

If two sets of the usual doubling dilutions of a known typhoid immune serum are tested with these emulsions a considerable difference is usually noted. With the first emulsion agglutination is present in the first tube (1 in 10) and is also seen in a variable number of succeeding tubes. The precipitate is light and flocular forming large easily visible flakes and appears rapidly (within about a quarter of an hour when kept at 55° C.). In the second series no agglutination is observed for at least an hour, but after three hours a typical finding is as follows: In the first two tubes there is no agglutination; in the third a very finely granular precipitate only visible through a lens; in the fourth, fifth and sixth (dilutions 1 in 80 to 1 in 320) a definite, easily visible precipitate in the form of small compact looking granules. The next tube (1 in 640) shows diminished intensity of agglutination and the subsequent ones no agglutination whatever.



Graphs showing agglutination of "S" and "R" emulsions by thirteen human sera (for Summary see page 208).

It has been found most convenient to represent these results in graphic form abscissæ representing the end dilutions and ordinates the degree of agglutination.

Agglutination with the standard emulsion (S-emulsion) is represented by a continuous line and that with the oxalate broth emulsion (R-emulsion) by a dotted line.

All the patients with typhoid fever admitted to the Melbourne Hospital during the last four or five months have been studied in this way as well as a number of individuals who had received prophylactic injection of typhoid or typhoid-paratyphoid vaccine, some of whom had pyrexia. The results obtained are shown graphically in the figure, brief clinical notes being given on page 000.

The cases of typhoid fever with one exception show curves of similar type. The titre of the sera to the standard emulsion varies within wide limits, but never shows any inhibition of agglutination in the lower dilutions. When tested with an oxalate broth emulsion the results are seen to be on the whole very uniform. Over a short range of dilutions usually about 1 in 160 to 1 in 320 there is a complete granular agglutination. Outside this range there is a more or less gradual diminution in the intensity of agglutination and the lowest dilutions practically always show complete inhibition. Different batches of oxalate broth emulsion vary a good deal in the readiness with which they agglutinate, and with the same serum the range over which agglutination occurs, may be much shorter in one than another. The point of maximal agglutination, however, remains the same.

The type of curve seems to remain very constant throughout the illness. Thus the serum represented in Curve VI. was taken very early in the second week of the disease. Six days later the titre to the standard emulsion had risen to 1 in 160, while the response to the oxalate broth emulsion was practically unchanged. The patient was then given small doses of vaccine intravenously and three weeks later showed a standard response to a dilution of 1 in 1,280. The oxalate broth emulsion curve was of the same form as previously, but showed almost complete agglutination at 1 in 1,280 instead of at 1 in 320 as before.

Curve III. represents a serum taken at the end of a prolonged convalescence during which the titre to the standard emulsion was followed through a gradual fall from 1 in 160 to less than 1 in 10. The reaction with an oxalate broth emulsion is seen to be of the same form as the others though reaching a maximum at a lower dilution.

Sera from persons who have been inoculated with typhoid or typhoid-paratyphoid A and B vaccines, show a different relation between the two curves. Agglutination with the oxalate broth emulsion is

often absent and if present is always very incomplete. The highest dilution showing any agglutination with this emulsion has always been lower than that with the standard emulsion and there has only once been any trace of an inhibition zone (No. IX.). These relations hold for men vaccinated during the war period and for members of the laboratory staff inoculated recently.

In the case represented in Curve XI. the serological reactions were examined at three or four day intervals for a month after inoculation. At no time was more than a trace of oxalate broth emulsion agglutinin demonstrable, although the titre to the standard emulsion reached 1 in 320 at one period.

It appears then that a fairly high titre to the oxalate broth emulsion with a characteristic inhibition zone developes early in nearly all persons suffering from typhoid fever, but is not seen in persons previously inoculated subcutaneously who are not actually suffering from the disease. The presence of such a reaction to the oxalate broth emulsion appears to be positive evidence of existent or very recent infection with typhoid fever.

Arkwright[1] has shown that amongst the dysentery-typhoid group of bacilli it is often possible to separate from a single culture two variants which, besides showing cultural differences, can be distinguished serologically. If one form, which he names the S-type, is used to produce an immune serum in rabbits, this serum agglutinates the corresponding bacillus in large loose floccules. When the other (R-form) is treated with its own specific serum, the agglutination is of a finely granular character. Each serum shows a considerably higher titre for its corresponding strain than for the other.

The work of Weil and Felix[2] throws some light on the nature of this variation which can best be explained on their view that there are two antigens involved. It seems probable that the typhoid bacillus possesses two distinct antigenic proteins which may be termed the "S" and the "R" agglutinogens. The former is less firmly attached to the bacillary body than the latter and can, to a very large extent, be removed by simple washing. In emulsions as ordinarily used it is for the most part free in solution and when treated with its appropriate serum the reaction occurring is mainly a precipitin phenomenon with a secondary agglutination of the bacillary bodies. The "R" agglutinogen is part of the bacillary body proper; its activity is shown more clearly with well washed bacilli and is inhibited if much "S" agglutinogen is present as well.

The amount of "R" agglutinogen in various bacillary emulsions seems to be fairly constant, but in the presence of more than a certain amount of "S" agglutinogen its existence cannot be demonstrated. The amount of "S" agglutinogen and its physical relationship to the bacillus determines the behaviour of an emulsion as regards its agglutinability. In an emulsion derived from an unwashed agar or broth culture grown under optimal conditions and after repeated subculture in broth, "S" agglutinogen is present in considerable amount, more so in some strains than in others, but in all cases plentifully enough to inhibit agglutination due to the "R" form. In the bacilli grown in oxalate broth, however, the "R" agglutinogen is set free from this inhibition either by the absence of the "S" agglutinogen or by some alteration in its nature.

Corresponding to the two agglutinogens sera from patients infected by *Bacillus typhosus* will develope the corresponding "S" and "R" agglutinins. The relative amounts of these may, therefore, be determined by the use of the two emulsions described and the essential difference between the two types of curves seen clinically, lies in the quantity of "R" agglutinin present in the serum. In inoculated persons it is almost absent, in early typhoid fever it is constantly present in moderate amount.

This appearance of the "R" agglutinin in the serum in persons with active disease only is probably to be explained as follows: In the case of subcutaneous injection of dead organisms, while the soluble proteins present including much of the "S" agglutinogen may pass into the blood stream, the bacillary bodies and their "R" agglutinogen are almost entirely dealt with locally. The strains used for prophylactic inoculation are also as a rule chosen among other qualities for their ability to excite a large production of agglutinin ("S" agglutinin). A relatively large amount of "S" agglutinogen with a minimum of the "R" form of antigen passes into the blood to evoke corresponding humoral responses.

In ordinary typhoid fever, on the other hand, an early septicæmia is a characteristic feature, so that the bacillary bodies as well as their detachable proteins can come into contact with the general antibody mechanisms and we have both "S" and "R" agglutinins elaborated. The anomalous result shown in Curve II. is very interesting from this point of view. The patient was admitted late in the third week from the onset of malaise, typhoid bacilli were isolated from the fæces immediately after admission and the patient did not appear ill. The temperature fell to normal in a week without specific treatment and convalescence was rapid. The whole course was extremely mild and devoid of the usual toxæmic characteristics. It is quite conceivable that in this case there was an infection almost confined to the bowel with very little septicæmia. This would explain both the mild nature of the symptoms and the absence of "R" agglutinin in the serum.

Summary.

Examination of the sera of suspected typhoid patients for the relative amounts of "S" and "R" agglutinins present by a method described will allow in most cases a positive differentiation between agglutination due to previous inoculation of typhoid-paratyphoid A and B vaccine and that due to an existing infection.

The presence of "R" agglutinin in easily demonstrable amount occurs only in cases of recent or existing typhoid septicæmia and in a majority of

such cases the "R" agglutinin appears in quantity before much "S" agglutinin is present.

The sera of persons inoculated subcutaneously with typhoid vaccine show an insignificant or no development of "R" agglutinin.

References.

(1) J. A. Arkwright: "Variations in Bacteria in Relation to Agglutination Both by Salts and by Specific Serum," *The Journal of Pathology and Bacteriology*, 1921, Volume XXIV., page 36.

(2) E. Weil and A. Felix: "*Über den Doppel-typus der Rezeptoren in der Typhus-Paratyphus Gruppe*," *Zeitschrift fur Immunitätsforschung, Teil* I., *Originale*, 1920, *Band* XXIX., *Seite* 24.

Summary of Cases.

The following is a brief summary of cases represented in the figure on page 206.

I.—Case B., male, forty-nine, with fairly severe typhoid fever, was admitted toward end of third week of disease. Blood culture positive. Treated by intravenous vaccine with crisis after fourth injection. This serum was taken two days after first vaccine injection. Typhoid bacilluria continued for nearly two months.

II.—Case W., male, thirty, with mild typhoid fever, was admitted with a history of three weeks' malaise with tendency to shiver at night and intermittent headaches. Temperature showed steady lysis for a week and was thereafter normal. No specific treatment. Discharged thirty-one days after admission; *Bacillus typhosus* was recovered from fæces.

III.—Case P., female, twenty-six, with prolonged typhoid fever, was admitted about the eighth day. Intravenous vaccine given with little effect; pyrexia till the fifth week with recrudescence of temperature during seventh and eighth. Agglutination titre to "S" emulsion fell steadily from 1 to 160 to less than 1 in 10. Serum taken during the tenth week of illness.

IV.—Case G., female, thirty, with pyrexial illness contracted on board ship after leaving Colombo, clinically of a mild typhoid fever. No bacilli were isolated. Treated with intravenous vaccine with good effect. Febrile for fortnight, crisis following vaccine and uninterrupted convalescence.

V.—Case S., female, twenty-three, had a gradual onset of anorexia, vague abdominal pain most prominent in the right iliac fossa, a good deal of vomiting. Appendicectomy was performed; the appendix was practically normal. She was admitted to hospital five days later with malaise, fever and leucopenia. Pyrexia about 38.3° C. (101° F.) for ten days with steady convalescence. No typhoid organisms isolated.

VI.—Case R., female, seventeen, was admitted with a history of three weeks' malaise; she was in bed for one week. The temperature fell during the first week in hospital, then there was a steady recrudescence of pyrexia with increasing toxic features. Vaccine was given intravenously with great benefit. Convalescence has since been uninterrupted. *Bacillus typhosus* recovered from the fæces.

VI., VIII., XI.—Three sera from recently inoculated normal subjects. VII. received stock typhoid-paratyphoid A and B vaccine; VIII. and XI., *Bacillus typhosus* vaccine only of a recently isolated strain.

IX.—A normal subject; received several typhoid-paratyphoid A and B bacilli inoculations during the war period and another about eighteen months ago.

X.—A case of pyrexia of short duration; no evidence of its being typhoid fever. The patient had received four typhoid-paratyphoid A and B bacilli inoculations during the war period.

XII., XIII.—Two cases of broncho-pneumonia in returned soldiers who had received vaccine during the war period.

The Mathison Lecture.

SOME NEW ASPECTS OF RESPIRATION.[1]

By W. A. OSBORNE, M.B., Ch.B. (Ireland),
Professor of Physiology, University of Melbourne.

This audience needs not to be reminded of the grievous loss we sustained when Captain G. C. M. Mathison died of wounds at Gallipoli on May 18, 1915. The promise of his student days had already passed into fruition and the beginning of a great life work appeared to have been made. We looked to him as one fitted by personality, knowledge, judgement, energy and originality to become a true leader in medical science. But it was not to be. The call of his race and of his country in peril of the enemy was, alas for us all, answered only too promptly.

The University of Melbourne has decided to utilize a sum of money placed in its hands by subscribers in such a way as to perpetuate his name by the foundation of triennial lectures and it is my great honour to deliver the first. Mathison was University Scholar in Physiology in my Department and I was in some measure responsible for his introduction to the physiological laboratory in London where he began his career as an original investigator. During that creative period of his life we kept up a brisk correspondence chiefly on research matters. I looked forward to much inspiring association and advice when as it seemed he was to direct medical research in Melbourne.

I hesitated whether this first Mathison Lecture should be a popular discourse to which the general public could be invited or whether I should make it purely technical and confine myself to some later developments of physiology which have been occupying my thoughts and the all too short and much too broken time that I have for research in a branch that is specially associated with Mathison's name. I decided on the latter course and so my lecture is entitled: "Some New Aspects of Respiration."

No one with biochemical knowledge can fail to admire the marvellous way in which the living cell can carry out its functions despite many severe handicaps. A modern organic chemist if challenged to effect a transformation of albumin into urea, water and carbon dioxide or of sugar into fat could take up the gauge provided he had the resources of his laboratory at his disposal and were allowed to use all the devices of his craft. But if the conditions were that he must do everything in an aqueous medium at a fixed reaction never departing from neutrality except to a minute degree, that the osmotic pressure must remain constant, that the temperature interval must never be more than a few degrees Fahrenheit, that the pressure should not be in excess of atmospheric except by a few millimetres of mercury, that he must not evaporate or crystallize or bubble gases, that the metallic ions with which his substances come in contact must not exceed four or be less than four, he would declare

[1] Delivered in the Physiological Theatre of the University of Melbourne on November 29, 1923.

emphatically that the task could not be done and might even commit himself to the opinion that it never could be done by the mind and hands of men. The devices for maintaining certain constants in the cell and its environment are very beautiful. These constants are of fundamental importance physiologically, though biochemically they sometimes appear as handicaps. A trifling rise of acidity would cause accumulation of carbon dioxide in the tissues, whilst a change towards the alkaline side would impair membrane structure and probably lead to unwanted oxidations. Chemical ingenuity also of the highest degree is manifested in the supply of energy and raw products and the elaboration of new products, though here the vegetable cell far transcends the animal. The removal of waste presents difficulties admirably surmounted. Nitrogen gas has a low solubility and few nitrogen compounds are at the same time easily soluble, non-basic and non-acid, stable and non-toxic, but urea has all the qualities desired. Fortunately carbon dioxide is fairly soluble in water and the amount carried by aqueous fluid is greatly increased by making use of bicarbonates. The controversy whether hæmoglobin forms a compound with carbon dioxide and helps to carry this body, has been settled, I think, in favour of the negative view. I will, however, add this original, if small, contribution to the subject. Hæmoglobin can be described as the compound produced by the union of an acid, hæmatin or hæmochromogen, with a basic substances globin. I have spectroscopic and chemical evidence that carbon dioxide dissolved in water at atmospheric pressure has sufficient acidity to form globin carbonate and turn out the hæmatin, particularly when the hæmoglobin is reduced. But at the pressure at which carbon dioxide exists in venous blood this action is not detectable.

Carbon dioxide has this disability that it increases the hydrogen ion concentration and as the tissues of the body and particularly certain nerve cells are more sensitive to rise of hydrogen ion concentration than any chemical indicator or electric detector, the body has to be elaborately safe-guarded by liver (coarse adjustment), kidney (fine adjustment) and lung (micro adjustment) from increase of acidity.

Oxygen.

The great difficulty is the supply of oxygen to the cells. This must have played a great part in evolution. In the insects the cells are aerated by the clumsy method of direct communication with the atmosphere through minute tubes. This has necessitated that insects remain small. Mr. Wells's giant wasps are a physiological impossibility. With the vertebrate came, not exactly the discovery of hæmoglobin, but the discovery that if hæmoglobin was locked up in minute semi-permeable bags with certain concentrations of certain salts, the oxygen carrying power of the blood would be eighty times as great. In that great advance from the water-breathing fish to the air-breathing amphibian oxygen needs probably acted as one of the leading determinants, for life on land has innumerable drawbacks contrasted with life in the ocean—falls, thirst, drowning, fire, frost, isolation, high blood pressure to counteract the pull of gravity on the blood, food deficient through drought *et cetera et cetera*. Its great advantage is the abundant oxygen supply. I will not go into the question whether the oxygen percentage of our atmosphere has fallen in the course of the ages, except to point out that a steady depletion goes on through oxidation of sulphur and of metals, particularly iron. This is seen in a small scale in disused mines especially those with faces of pyritic rock where, as Haldane has shown, the oxygen percentage may actually be zero. Every ton of iron now mined and smelted is eventually turned to rust and this means oxygen withdrawn from the air. The replenishment by plants compensates only for the loss by oxidation of carbon. Fortunately the total amount of oxygen contained in the atmosphere is so great that the abstraction due to human agency on our present scale of working is relatively trifling.

The Frontier of Oxygen in the Cell.

The day has long gone past when we regarded oxidation as the sole source of energy available to life. The anaerobic yeasts and bacteria have taught us differently. An interesting example is *mucor* which, grown on the surface of jams, oxidizes the sugar to water and carbon dioxide; but if oxygen be denied it will obtain its energy by the transformation of sugar into alcohol and carbon dioxide. The lactic bacillus will get all the energy it wants by the fall (speaking thermo-chemically) of sugar to lactic acid and here oxygen is not wanted. The work of Hopkins and later of A. V. Hill and his pupils have shown us that the contraction of muscle is an anoxybiotic process; oxidation is really post-contractile. I should not be surprised if every cell displayed something similar. It is well within possibility that in the centre of the cell or at least in the part most remote from the oxygen supply there are activities which do not require oxygen and where oxygen may be harmful. The one strong piece of evidence in favour of this view is the toxicity of oxygen breathed at pressures of an atmosphere and more. The killing of an animal by three atmospheres of oxygen is easily demonstrated. I have done it often and clinical evidence exists, I believe, to show that even at atmospheric pressure oxygen breathing can be harmful. We may picture, therefore, the oxygen tension falling as we pass from capillary to lymph and from lymph to cell and finally reaching zero in a faintly fluctuating frontier somewhere inside the cell. Raise the oxygen pressure and you drive the oxygen into regions of the cell where it has no business to be. I am often tempted to think that in hyperthyreoidism the adjustment is disturbed and the tissues get more oxygen than they need.

Oxygen Lack.

The oxygen requirements of cells vary with their variable activities. When activity is increased in a small mass of tissue, all that is necessary is that the local arterioles dilate and bring sufficient oxygen and adequately remove the carbon dioxide. But if the tissue be large enough to affect the blood as a whole, then the circulation as a whole and the mechanisms of breathing are called upon for fresh

adjustments. The extreme of this is to be found in the distressed breathing and great circulatory excitement of violent exercise. At rest some six litres of blood pass through each chamber of the heart per minute; in sprinting the amount is one hundred and twenty litres. At rest the body uses two hundred cubic centimetres of oxygen per minute; in violent exercise this is raised to four thousand cubic centimetres. What sets these activities going?

I think there is a tendency today to ignore altogether the psychic factor in considering adjustments of the circulation. Through long ages of experience circulatory excitement reflexly precedes and accompanies fight, hunting and competitive games (mimic fight or mimic hunt). The emotion of fear which means possible fight or flight or exceptional effort evokes this response. From our knowledge of hæmoglobin we can state with assurance that this preparatory activity of the heart and of the lungs cannot add appreciably to the oxygen of the blood; but it can lower the carbon dioxide tension in the blood and so act like the preliminary deep breaths which allow a longer submersion to the diver. However, this psychic reaction is small compared with the major changes of circulation and respiration accompanying respiration.

As Haldane has so forcibly pointed out it is the need of the active tissues which determines circulatory and pulmonary activity and the adjustment is of a very precise and delicate character. There is one small portion of tissue which has its share of the circulating blood and is exquisitely sensitive to those changes in the blood that occur when the oxygen supply of a major tissue is not adequate for its needs. This is in the *medulla oblongata* and can connect up with the nerve cells activating the contractile tissue of heart, artery and respiratory muscles. If a tissue's activity alters the blood to a greater degree than quiet respiration can rectify, then the changed blood operates on this sensitive centre and the respiration and circulation are quickened until normality of the blood is reached. What is it in the blood that comes from a working tissue and operates thus on the medullary centres? Our debt to Haldane is great for breaking away from the nervous theories of respiratory guidance and pointing to carbon dioxide as the probable cause. Has the carbon dioxide a specific action and how can one account for the great respiratory and circulatory activity when oxygen is deficient and yet the carbon dioxide is allowed free escape as in breathing nitrogen or hydrogen. It is here that Mathison came forward with some suggestions the outcome of experimental investigation in the laboratory. Working first of all with the spinal (*id est* decapitated) animal[1] he found that "lack of oxygen, excess of carbon dioxide and weak acids injected into the blood are all capable of stimulating the spinal vaso-motor centes." Again, "there is so much in common between the phenomena produced as the result of the action of oxygen lack, excess of carbon dioxide and injection of acids upon the nervous mechanisms of the spinal cord (that) there is in all probability something in common between them as regards the manner of their action."

In his next paper[2] on the effects of asphyxia upon medullary centres he was more explicit. "Oxygen lack, administration of small percentages of carbon dioxide and injection into the blood stream of weak organic acids all cause rise of blood pressure by stimulating the vaso-motor centre. The results obtained suggest the existence of a common factor, probably the hydrogen ion content of the blood, underlying the action of oxygen lack and of excess of carbon dioxide upon nerve centres." You are, of course, aware that muscular and possibly other activities in the absence of adequate oxygen cause liberation of lactic acid which enters the blood stream.

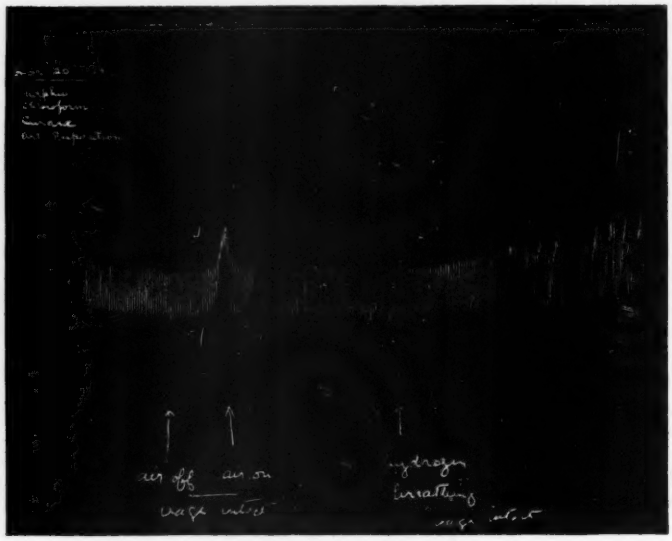


FIGURE I.

In ordinary asphyxia there is a period of apnœa and then systemic arteriolar contraction is produced. In hydrogen breathing there is apparently a larger apnœic period. A small part of this delay is due to the time taken for the hydrogen to pass from the pump through the tube system and to displace the oxygen in the lungs. Chloroform, curare, artificial respiration; vagi intact.

The similarity of action between simple oxygen lack and asphyxia proper where heaping up of carbon dioxide is added to oxygen lack is easily shown experimentally and is certainly striking. Figure I. gives the carotid blood pressure of a curarized dog. The pump for the necessary artificial respiration was stopped to bring about asphyxia proper. Simple oxygen lack was produced by delivering hydrogen by the pump into the lungs. The events indicated by the arrows are to be registered on the tracing vertically above the arrow heads. In each case the blood pressure rises and in the second rise vagal slowing of the heart is evi-

dent. Though oxygen lack must obviously occur sooner with hydrogen breathing, yet in my experience the excitement of the vasomotor centres occurs later than with asphyxia proper, just as Lumsden has recently shown[3] that the medullary gasping centre of the cat is stimulated more powerfully when oxygen lack and carbon dioxide excess coexist. Naturally the period of stimulation is brief in all cases, for paralysis due to anoxæmia and also to a lesser degree to the narcotic gas carbon dioxide eventually supervenes.

Mathison's contention that the hydrogen ion is the agent responsible for stimulation of medullary and spinal centres is probably correct, but has not yet been fully proved. Lumsden,[3] for instance, finds his pontine expiratory centre sensitive to carbon dioxide, but not to oxygen lack. It is possible here that anoxæmic paralysis comes on quickly and prevents the acidity stimulation.

I must not omit in this connexion an observation which I made on anoxæmia due to high attitude. In July, 1922, I was at the summit of Pike's Peak, Colorado, four hundred and thirty metres elevation from sea level. The stay was brief but, though I expected to see and feel symptoms of mountain sickness, these were not in evidence. I did not have a chance of observing the colour of my own face, but the complexions of the various members of the party were normal. There were no cases of epistaxis or fainting and the only psychic element was a mild exhilaration.

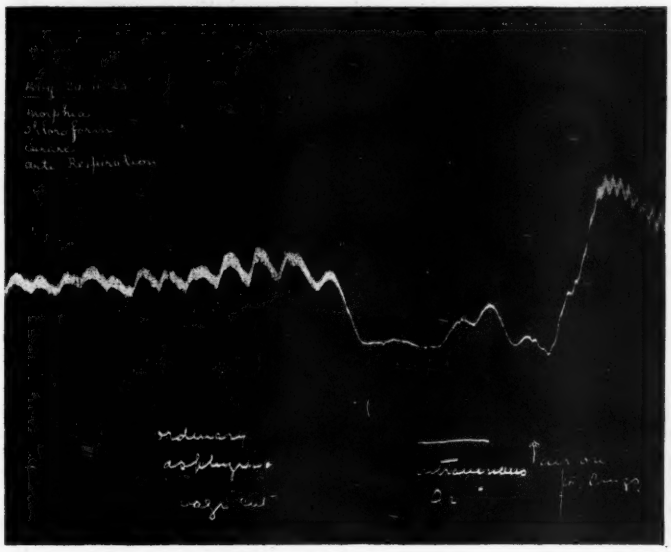


Figure II.
Ordinary asphyxia has been going for some time. Then comes the quick collapse of the heart. Intravenous application of oxygen produces some cardiac recovery, but not as good as restored respiration. Chloroform, curare, artificial respiration; vagi cut.

Yet a few weeks before some friends had quite a different experience. There was much nose bleeding and respiratory distress and some of the party were unable to complete the journey to the summit. On making inquiries and looking up records I found that my friends had encountered a stiff breeze, whilst I made the ascent in a dead calm. I learn by a personal letter from Mr. J. Barcroft, of Cambridge, that this action of the wind has not passed unnoticed.

Administration of Oxygen.

In the administration of oxygen in ordinary medical practice two facts are not sufficiently borne in mind, I am inclined to think. One is the amount of oxygen necessary for a human being. I have seen oxygen delivered to a patient's face in amounts which, without exaggeration, would just suit a fox terrier. The other is that no matter how well oxygen is administered, if there is interference with the gaseous exchange between air and blood in the lungs, carbon dioxide goes on heaping up. The excess of this toxic gas is in no way relieved by the oxygen; rather is it increased, but such slight increase is generally more than counter-balanced by the advantages of the oxygen.

In the year 1915 I first began experimenting with intravenous administration of oxygen for the relief of asphyxia and demonstrated my results to students. I was led to this research by Leonard Hill's discovery that in decompression oxygen bubbles did not, like nitrogen, give rise to fatal embolism owing to absorption of the gas. Shortly after this some American investigators advocated its use. I was surprised at this, as my results made me unwilling to apply the method to human beings. Lately I have repeated the experiments and have obtained much the same effects. The needle must be very fine. In dogs I have used the femoral vein for injection. Briefly stated, my results have been that decided relief is given more strikingly with hydrogen breathing than with full asphyxia; but the relief is short-lived. Something happens which injures the heart and lowers the blood pressure gradually till death occurs; possibly nitrogen impurity of the oxygen leading to embolism. The two tracings shown in Figures II. and III. illustrate the point. It will be observed though that the re-establishment of breathing gives a very much better recovery.

Reflex Vagal Slowing of the Heart.

No demonstration in experimental physiology is so certain of success as that where a high pressure in the aorta produces reflex slowing of the heart. The animal is curarized to prevent the complication of muscular movement. It occurs particularly well with administation of adrenalin and in asphyxia (see Figure IV.). We assume that in the arch of the aorta there are receptors which start impulses when a critical tension has been exceeded and these impulses travelling to the medulla form a reflex arc ending in the vagal receptive substances of the cardiac pace-maker. This "heart roving"

action is undoubted, but I am never able properly to interpret the meaning of the phenomenon. Here we have intense vaso-constriction of the arterioles, especially those in the splanchnic area; but the blood pressure goes up very little if the vagi are normal as the reflex slowing is so pronounced. One cannot speak of an accelerated circulation with the heart beating so slowly. Is the complex of events that we get in the curarized animal quite applicable to the uncurarized?

Apart from this problem there is one aspect of the matter which has a direct clinical bearing and about which I have recently carried out experiments. You are aware that in the dog (and in the human being, as is shown by atropine) the removal of vagal connexion produces at once cardiac acceleration. Normally, therefore, restraining impulses are passing down to the heart. What sets these going? I think I have the answer. By means of the string galvanometer I was able to demonstrate that raising the pressure in the dog's aorta by adrenalin, by asphyxia or by ligature in the abdomen sent up a stream of messages through the vagus. I assume that they pass up in "depressor" fibres which are separate in the rabbit. I next tried whether lowering the pressure by nitrates or hæmorrhage acted upon any receptors and started a reflex quickening of the heart. On observing the string of the galvanometer I found it moving in the same direction as when I lowered the aortic blood pressure from high to normal. When the pressure was substantially reduced by hæmorrhage, a slight tremor of the string vanished and it took a position which seemed to be the limit of the movement described. The interpretation of this is that just as there is a critical carbon dioxide pressure or hydrogen ion concentration which keeps the respiratory centre active, so there is a critical pressure in the aorta which in the absence of vigorous muscular movement keeps up a continual vagal restraint. Lowering the pressure below this point abolishes the reflex and the heart is quickened. Further, it is a well established fact in physiology that these aortic receptors start a reflex which ends in arteriolar vaso-dilatation and which may take precedence over the heart effect. There is here, therefore, a beautiful self-adjusting mechanism for maintaining constancy of aortic pressure in the absence of vigorous muscular movement. The height of the blood pressure is determined by the tension which starts off the special receptors in the arch of the aorta. I do not intend to convey the impression that information from the aorta is the only information that arrives at and influences the vagal and vasomotor centres. Bainbridge's work tells us that impulses may arise from the great veins. But I would maintain that the aortic mechanism is that which is normally in operation.

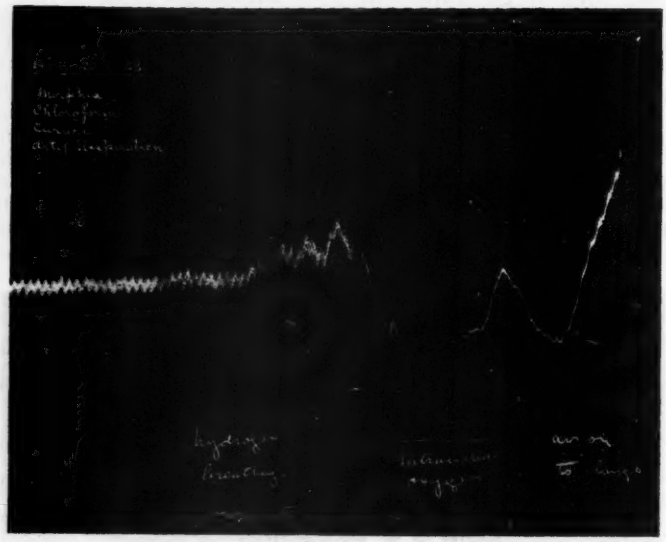


FIGURE III.

The hydrogen breathing has given a rise of blood pressure and then the usual collapse of the heart. Intravenous application of oxygen produces some cardiac recovery somewhat better than with ordinary asphyxia, but not as good as restored respiration. Chloroform, curare, artificial respiration; vagi cut.

Now I want to put this query to an audience that thinks clinically. Might not some circulatory disturbances be due to disorders of this reflex arc and particularly to disorders of the aortic receptors? One can easily imagine in arterial disease these receptors becoming blunted with consequent raising of the threshold that starts vaso-dilatation and cardiac slowing, automatically lowering the pressure. Or the reflex may be abolished and this safeguard be destroyed altogether.

FIGURE IV.

A typical tracing of carotid blood pressure in the curarized dog during asphyxia. The vagi are intact and the reflex slowing of the heart is well shown. Chloroform vapour was in the air breathed.

Problems Unsolved.

Haldane whose splendid contributions to the physiology of respiration arouse our admiration, brings us sharply to earth with the assurance that the mechanisms which adjust the volume and

quality of the blood to the cells' requirements are by no means fully discovered. May I in conclusion draw your attention to two of these lacunæ?

One is the participation of muscular movement in the expiratory act during quiet breathing. Where the truth lies in this vexed question, I cannot say, but I am certain of one thing and that is the total inhibition of the diaphragm during expiration. Mr. Kilvington and I in the course of a research sutured the central end of a cut phrenic in a dog to the distal end of a cord of the brachial plexus. After regeneration was complete the animal was lightly anæsthetized and skin removed exposing the deltoid. During inspiration a number of fibres of the deltoid contracted vigorously. What surprised us though was the appearance of these fibres during expiration. They bulged out owing to the tonus pressure of the properly innervated fibres beside them. This was proved by killing the animal when the phrenic fibres could not be distinguished.

The other point is the action of the bronchiolar musculature. When it goes wrong you are aware of its existence. Haldane's estimations of dead-space air have made it fairly clear that in excited breathing these muscles are relaxed and the lumina of the tubes they line greatly increased. In carrying out artificial respiration in an animal we have a mechanism that sheds some light on the problem. The pump I use for artificial respiration sends a periodical blast of air into the trachea; the elasticity of the lungs and the weight of the thorax are left to carry out expiration which takes place through a hole in the tracheal cannula. Now every experimenter finds that the size of this hole matters a good deal, quite apart from the leakage of air during inspiration. In a word it controls the time taken for the escape of air during expiration. May not the bronchiolar muscle be something very similar? A too free escape of air from the air cells in quiet breathing might not allow sufficient time for adequate gaseous exchange. The possible importance of these muscles has not escaped Haldane's notice; he says:[4] "It seems probable that by some means at present unknown to us a fair adjustment is maintained normally between air supply and blood supply. For instance, the muscular walls of bronchioles may be concerned in adjusting the air supply."

There are many other aspects of respiration where research is needed and the problems can only be solved by the application of Mathison's methods—laboratory experimentation first and foremost and a very critical handling of clinical material. Mathison was a trained man of science with the mental alertness and courage of the research student. He knew well that except in the ephemeral minutiæ of surgical technique advancement in medical science is to be made in the laboratory, whilst the clinician remains a clever, an inspiring and most useful, I might say indispensable, critic.

But Mathison was able and willing to apply physiological and pathological science to the immediately practical and therein he displayed exceptional powers. A relization of the rarity of this combination of faculties adds to our sorrow over his loss.

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(1) G. C. Mathison: "The Action of Asphyxia Upon the Spinal Animal," *The Journal of Physiology*, Volume XLI., No. 5, December, 1910, page 416.

(3) G. C. Mathison: "The Effects of Asphyxia upon the Medullary Centres, Part I.: The Vaso-Motor Centre," *The Journal of Physiology*, Volume XLII., No. 4, May, 1911, page 283.

(2) T. W. Lumsden: *The Journal of Physiology*, Volume LVIII., October, 1923, page 81.

(4) J. S. Haldane: "Respiration," page 42.

Reports of Cases.

MYXŒDEMA WITH A FAMILY HISTORY OF ENDEMIC GOITRE.[1]

By John Bostock, M.B., B.S. (London), D.P.M., M.R.C.S., L.R.C.P.,
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The patient, a married woman, *ætatis* thirty-five years, with one child living, was admitted to Callan Park Mental Hospital in January, 1922.

She had had a healthy girlhood except for "fits," which, however, ceased at the age of thirteen. For five years before admission she had begun to be very "nervy." Two years after the onset of symptoms she was knocked on the head during a quarrel between her husband and a friend. She became acutely excited and her relatives are emphatic that this was the starting point of her psychosis.

Just before admission she was depressed, suspicious and confused. She was terrified, but could not explain why. She had a waxen sallow appearance with an icteric tinge. She improved considerably with increasing doses of Fowler's solution and thyreoid tablets and was discharged on leave in July, 1922.

In July, 1923, she returned to hospital. Mental examination showed extreme retardation. She knew her location,

[1] Read at a meeting of the New South Wales Branch of the British Medical Association on November 2, 1923.

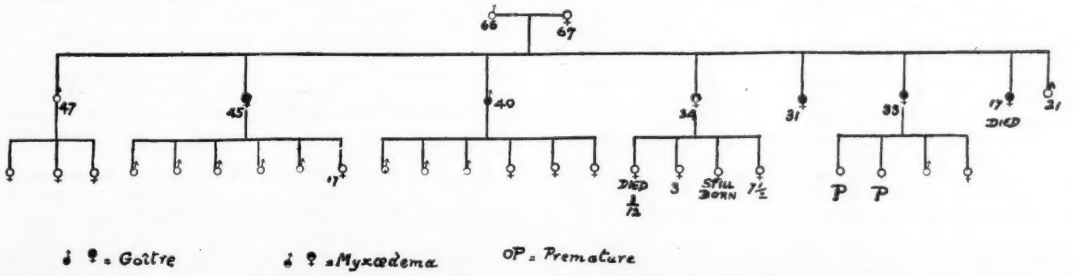

FIGURE.—Genealogical Tree to Dr. Bostock's Case of Myxœdemia.

but could not give the date. She was depressed and had vague delusions about a ghost being in the house. Owing to her slow cerebration, it was difficult to hold a conversation with her. The voice was "cracked." Physically the skin was waxy in appearance. The lips were swollen and œdematous, as were also the lower extremities. The skin was dry. The hands were stumpy, the fingers square. The deep reflexes were brisk, but the superficial ones were diminished. There was general hypo-æsthesia to pricks. The pulse rate was fifty-six. The systolic blood pressure was one hundred and eighteen millimetres and the diastolic ninety millimetres. The extremities were cold. Examination of the blood by Dr. Latham showed that the red cells were uneven in size, but not greatly so. There were no nucleated erythrocytes. Of the leucocytes 69% were polymorpho-nuclear cells, 24% were lymphocytes, 6% were large mono-nuclear cells and 1% eosinophile cells. The thyreoid gland was not palpable.

A diagnosis of myxœdema was made. Thyreoid extract was exhibited in daily doses of 0.18 gramme (three grains) and she improved rapidly. The œdema disappeared. The skin became moist, but the cerebration although much quicker was still slower than in the normal. She left hospital in September, 1923.

Interviews with her relatives made possible the compilation of the accompanying genealogical tree. The father was native born and the mother came from England. They settled in Broadwater, Richmond River, New South Wales, where the family was reared. The home appears to nestle at the foot of the hills. Both well and stream water were used for drinking. The incidence of goitre in this family is confirmatory of the view that it is due to contamination products found in the water supply. With the exception of the sister who died early in life, all seem to have suffered from the parenchymatous type with few general symptoms. The goitres ranged in size from small generalized enlargement to what my informant called a "huge affair" which overflowed the collar.

Myxœdema in the case of the present patient appears to have followed a hyper-functioning of the thyreoid gland in an individual whose gland had undergone previous alteration.

Reviews.

CARDIOLOGY.

OF the many recent works dealing with the heart the book by Dr. S. Neuhof is among the latest.[1] The author's aim is to present the newer contributions to the subject in a manner that can be readily grasped by the general reader. In this he is only partly successful.

The opening chapters are devoted to the embryology, anatomy and physiology of the heart. This part is well done.

The usual graphic methods are well described. Many illustrations are shown. The author deals in the main with abnormal curves which have questionable interpretations. This confuses the reader who is looking to the work to show him the more usual curves and their interpretation. Thus in dealing with split *R* or *S* complexes the author states that they can be produced in the dog by inserting a steel sound through the jugular vein into the ventricular cavity. By tilting the sound against the ventricular wall, the split *R* complexes are produced. He attributes this to a physical disturbance of the ventricular balance. A more likely interpretation, however, would be that the pressure of the sound is interfering with the conduction in the right bundle or its branches.

In parts the book is loosely written. For example, the author writes that a positively deviated *T* denotes that the excitation wave has "entered" the ventricular base. Later on the *T* wave is correctly referred to as "the final end" of the excitation process in the ventricle.

A long chapter is devoted to the arrhythmias. The author divides sinus arrhythmia into physiological and pathological causes. It is not made clear what are the pathological causes. On the other hand on page 477, in another part of the book, he writes that it is now generally held that sinus arrythmia is a physiological phenomenon in the majority of cases. The author's views of auricular fibrillation are very misleading. He asserts that "auricular fibrillation is regarded as basically due to irregular blocking of a continuous circus wave of excitation, the normal method of spread of impulse through the auricles. Although the circus wave still continues, blocking of it depends upon differences and defects in conductivity and irritability of various portions of the auricular musculature."

Figure 153, a polygraph tracing said to be auricular fibrillation, shows a regular pulse rate of sixty. This may be a slip, but there are other statements in the book of the same kind, such as that digitalis may cause a "fairly regular pulse rate" in auricular fibrillation.

There is a good description of the uses of the ortho-diascope. The author's views on hypertrophy of the heart are in line with the conclusions determined by research. He states that all methods of percussion employed to determine the size of the heart are found to be inaccurate and unreliable even for clinical purposes when their results are checked by the standards of direct observation as furnished by the ortho-diascope. The chapters dealing with this subject and the physical examination of the heart are well worth reading. He describes a clinical method for the determiation of the size of the heart.

The diseases of the heart are described under their causative agents, such as rheumatism, syphilis and cardio-sclerosis, the arterio-sclerotic heart and so forth.

Chapters are devoted to therapeutic measures, the sociological aspects of heart disease, præcordial pains of cardio-vascular origin *et cetera*.

The last one hundred and sixty pages are devoted to the discussion of cases. They are arranged as clinical bedside lectures and many of the points emphasized in the text are illustrated in these commentaries. At the conclusion of each chapter is given a list of references.

The book cannot be recommended as a text-book. It is diffuse and at times inaccurate. The subject of arrhythmia which permeates the book is not precise where precision is possible. On the other hand there is much valuable information in the book and an absence of such dogmas of old conservative teaching as are now proved to be incorrect.

[1] "The Heart: Its Physiology, Pathology and Clinical Aspects," Selian Neuhof, B.S., M.D.; 1923. Philadelphia: P. Blakiston's Son and Company; Royal 8vo., pp. xii. + 701, with 300 illustrations. Price: 50s. net.

THE VASO-MOTOR SYSTEM.

IN "The Vaso-Motor System," Sir W. M. Bayliss has added a new volume to the useful series of monographs on physiology. From a man of the very high standing of Sir W. M. Bayliss who himself has contributed so much to the understanding of the mechanism of the vaso-motor system, the reader expects to find a monograph dealing in an authoritative and judicial manner with the subject. This book, however, execllent as it is, is somewhat disappointing.[1] In a series of chapters the author studies the structure and properties of the blood vessels, the general anatomical arrangement of the vaso-motor nerves, the effects of stimulation of vaso-motor nerves, vaso-motor reflexes, chemical and pharmacological action on arterioles, the capillaries, the veins, hæmorrhage and shock. Excellent summaries of the work published by investigators in these various fields are given and a good idea may be obtained of the present state of knowledge, but the reader will look in vain for some sort of guidance among the many conflicting views presented. There is a very full bibliography.

In spite of its failings the book will be an extremely useful one to anyone wishing to keep abreast of the modern work on the vaso-motor system.

[1] "Monographs on Physiology: The Vaso-Motor System," by Sir William M. Bayliss, M.A., D.Sc., LL.D., F.R.S.; 1923. London: Longmans, Green & Company; Demy 8vo., pp. 163, with 67 figures. Price: 7s. 6d. net.

The Medical Journal of Australia

SATURDAY, MARCH 1, 1924.

The Medical Research Council.

The annual report of the Medical Research Council for the year 1922-1923, like its predecessors, is a book of much importance for many reasons. It not only embodies a sort of index to the problems that are engaging the attention of the medical and hygienic world for the moment. It also provides sufficient information concerning the nature of the work and the manner in which new and old problems are being attacked, to render it possible for the reader to gauge the value of the individual and collective investigations. Such an evaluation is not always possible when only the published results of one or other research are considered. Many highly important and promising pieces of work have been ignored in the past because the information revealed seemed to be restricted and the indications for further work, the logical following up the train, were relatively obscure. In the report of the Medical Research Council the authors present nearly all the research work carried out in Great Britain in brief summary and thus render a full appreciation of the value of individual endeavour relatively easy. Moreover, it is one of the chief functions of the Medical Research Council to coordinate effort in research and consequently progress can be assessed from this short collation. There is another aspect of the report which has especial interest to the medical profession in Australia. The Medical Research Council has been in existence under its present name and under its former title for ten years. They were not ten ordinary years. In some respects the war provided stimulation and material that might have been impossible under other circumstances. It also placed in the hands of the authorities an almost unlimited supply of men to do the work. In this way the fascination of research work reached a greater number than would have been the case had there been no war. On the other hand the abnormal years involved certain grave disadvantages to the steady progress of medical research. In the first place the financial stringency restricted the support that the public could provide out of consolidated revenue. For a time it probably reduced the size of those munificent gifts that wise rich men make to scientific research. Arising from this it stemmed the movement for a time in the direction of creating lucrative careers for men and women with genius for research. Then it diverted the work of many from hygiene and preventive medicine of peace time to that connected with special problems in preventive and curative medicine rendered necessary by the disaster of war. It is true that many of the war problems in hygiene can be applied to ordinary life conditions and in consequence the war may have hastened progress under the impetus of necessity. But other problems have fortunately little application to civil life and the need to push aside other work in order that these war inquiries might be prosecuted, has not been advantageous. Lastly a great deal of work has been carried out rapidly in the full light of the public gaze. It is not impossible that some of the investigators have sought a short cut to eminence. The result of hurried work and forced results is that it is unreliable and soon has to be disregarded. There are no short cuts in science. Every step must be taken deliberately and in proper order. Frequent and voluminous publications are not usually the product of workers on whom scientific progress depends. The authors of the report call attention to the fact that much research work of undoubted value has no immediate and apparent application to practical medicine. We are almost tempted to go one step further and to assert that investigations that yield direct results for the treatment of disease, are of small importance as compared with those that establish facts in connexion with the normal and altered physiology of the body.

At first sight it would appear that the Medical Research Council has command of a very large amount of money. The grant-in-aid provided by Parliament was £130,000. This included the aid for conducting the work of the Industrial Fatigue

Research Board. The sum of £8,000 was expended in administration; £38,000 were allotted to the National Institute for Medical Research. The remaining £84,000 were doled out as research grants. A moment's thought, however, will render it obvious that research is not in clover in these circumstances. The amount provided for the National Institute has to cover the upkeep of the institution, the purchasing of material, the wages of a relatively large staff of attendants and non-skilled persons, the salaries of a permanent scientific staff of seventeen persons, including men and women of eminence and the salaries of permanent and temporary assistants both in the institute and in the associated field laboratories. Similarly the grants are divided between so many individuals and so much of it is expended on material that there is no inducement at the present time for those with a natural aptitude to adopt research as a career. Research work of real value can only be carried out when the worker has been adequately trained. The custom of today is for a young man with ability and undoubted intelligence to work for a few months in a recognized laboratory and just when he is becoming proficient, when he has mastered those arts that are indispensable to sound technique, he relinquishes the laboratory for a remunerative practice. We would therefore draw one lesson from the report; it is that no amount of coordination will compensate the lack of generous remuneration of research workers. As a corollary we would urge that the amount of work should be determined by the amount of money available. In Great Britain the Medical Research Council apparently aims at a maximum amount of research; the remuneration is dependent on the amount of money available after the instrument maker has been paid, the plumber, painter, carpenter have received full value for their work in the institutions and after everyone else has had his claims satisfied.

The Medical Research Council has accomplished a great deal even under these unfavourable circumstances. Team work and especially the appointment of special committees to organize investigations into certain matters are admirable devices and the Committee has made ample use of them. The library that it has created by the publication of its special reports, has become a mine of information. Research awaits its development in Australia and the precept of the Medical Research Council should be in full view during the process.

Current Comment.

PRIMARY PNEUMOCOCCAL PERITONITIS.

Two distinct forms of pneumococcal peritonitis are recognized. There is a secondary form in which the peritoneal involvement is an accompaniment to a pneumococcal lesion in some other part of the body, and a primary form in which the peritoneal lesion is the only manifestation of the disease. In regard to the pathogenesis of the primary form little finality has been reached. It is held by some observers that the infection is hæmatogenous. Others insist that the organisms gain access to the peritoneum by passing through the intestinal walls, while a third group maintains that the path of infection is that of the genital tract. The supporters of the first view have drawn their conclusions from the fact that organisms can be isolated from the blood of patients in the early stage of the disease and from analogy with the conditions found in other diseases. The theory of infection from the bowel was held by Stoos, Jensen, Annand and Bowen and others. There has, however, been no definite evidence forthcoming which could be regarded as confirming this view. The theory of infection by the genital tract was discussed in 1920 by McCartney and Fraser. They discussed the question from a clinical point of view and described thirty-six primary cases occurring in girls between the ages of two and eleven. It has been pointed out that pneumococcal peritonitis only occurs among the poorer and less cared for classes of the community and that in these individuals the access of virulent organisms to the genitalia is more liable to occur. It is held that once having gained access to the genital tract the organisms travel by way of the uterus and Fallopian tubes to the peritoneal cavity. It is interesting to note that Bond in 1905 described what he termed an upward mucous stream in the uterus. This was not confined in his description to the genital tract, but was present in other organs. He injected indigo-carmine into the *os uteri* of twenty-two patients at periods up to twenty hours before abdominal section. In all but four the pigment was found in the peritoneal cavity. Bond held that the upward stream was not dependent on functional activity, since it occurred in senile uteri and the uteri of women who had passed the climacteric. On the other hand Annand and Bowen reported that of forty-five patients suffering from primary pneumococcal peritonitis thirty-eight were females and seven males. Michaut found twenty-seven primary cases in girls and six in boys.

Bryant stated that in adults the condition was more common in men than in women.

Dr. J. E. McCartney has recently reopened the discussion. He states that the literature does not contain the record of a single undoubted primary case in a boy.[1] He claims that the problem of the pneumococcus reaching the peritoneum by way of the genital tract has not hitherto been studied from a bacteriological or an experimental standpoint. He gives details of experimental work which he has carried out. He obtained material from ten patients suffering from primary pneumococcal peritonitis and submitted it to bacteriological examination. The specimens included swabbings or pus from the upper part of the peritoneal cavity, a swabbing from the pouch of Douglas, a swabbing from the vagina, a swabbing from the throat. One to three cubic centimetres of blood from the venous circulation were taken for culture and a catheter specimen of urine was examined by the precipitin test. Pneumococci were isolated in all ten instances from the specimen from the lower portion of the abdomen, in nine from the upper portion of the abdomen, in ten by blood culture, in ten from the vaginal swabbing. Seven throat swabbings were submitted to examination, in six pneumococci were isolated. Four specimens of urine were submitted to the precipitin test, in two a reaction was obtained. The type of pneumococcus was determined in every instance. The type of organism found by blood culture and in the vaginal secretion was identical with that in the lower portion of the abdomen. In one instance the type found in the throat differed from that causing the abdominal lesion. Dr. McCartney attaches some importance to this in his conclusions and says that it supports the genital theory of infection. Permission for autopsy was obtained in only three of the eight fatal cases. None of these were of the fulminating type of the disease. The points investigated were the presence of any other focus of pneumococcal infection such as in the lungs, any evidence supporting the intestinal theory of infection and any evidence in favour of the view that infection ascends the genital tract. No evidence in support either of the hæmatogenetic or the intestinal theory was found.

He then made attempts to infect animals by the blood stream, the gastro-intestinal tract, the lymphatics and the genital tract. Rabbits inoculated intravenously with pneumococci died of septicæmia within twenty-four hours and in no instance was peritonitis produced. Rabbits were fed with pneumococci and no abnormal lesions resulted, though the acidity of the gastric secretion was neutralized by the administration of bicarbonate of soda and the peristaltic movements of the bowel were inhibted by tincture of opium. An attempt to produce spread by the lymphatics from the vagina to the peritoneum was unsuccessful. Efforts to produce peritonitis by the injection of pneumococci into the vaginæ of rabbits were not successful on account of the susceptibility of the animals. They died of septicæmia before peritonitis could be produced. Rabbits having proved unsatisfactory, monkeys were made the subject of experiment. Three were used and in one instance a pneumococcal peritonitis was produced after three vaginal inoculations extending over a period of twenty-eight days. No experiments were undertaken with a view to the production of peritonitis in monkeys by intravenous injection.

In discussing his results Dr. McCartney lays stress on the clinical evidence in favour of the vaginal method of infection. He also, as previously mentioned, refers to the instance in which the type of pneumococcus in the throat was different to that in the abdomen of a patient. He thinks that the path of infection in this individual was not by the pharynx or the intestinal canal. His final conclusion is that primary pneumococcal peritonitis affects only females and that the infection reaches the peritoneum from the vagina.

The first part of his dictum differs from the findings of other workers. The bald statement is made that the literature does not contain the record of a single undoubted primary case in a boy. No reasons are given for refusing to accept as primary pneumococcal peritonitis the condition regarded as such by others and described by them as occurring in males. In regard to the latter part of Dr. McCartney's statement it must be remembered that in only one animal was he able to produce a pneumococcal peritonitis and this after repeated injections of moderate quantities of virulent bacilli spread over a considerable interval of time. Identical conditions with these do not exist in natural infection. There is a vast difference between the introduction at regular intervals of relatively large doses of virulent bacilli into the vagina and the chance inoculation with these organisms of the vaginæ of children living in unhygienic and squalid surroundings. Dr. McCartney has pointed out that an alkaline reaction in the vagina is conducive to the survival of the pneumococcus in that region. He states that the presence of vaginitis may render the vaginal secretion neutral or faintly alkaline. It has not been established as a clinical fact that pneumococcal peritonitis is preceded by vaginitis. Dr. McCartney has shown that in ten patients suffering from the disease the type of penumococcus present was the same in the peritoneum, the blood and the vagina. The presence of a different type of organism in the throat found once in seven times is not of material importance, for it has long been recognized that penumococci of Type III. may inhabit the throats of healthy persons as saprophytes without leading to a pneumococcal infection. It is not beyond the range of possibility that there exists a portal of entry, as yet undiscovered, which occasions a general septicæmic infection and that the presence of organisms in the vaginal secretion, throat and so forth may be a result of this. It is as reasonable to adopt this assumption as it is to assume on the evidence offered that infection invariably reaches the peritoneal cavity from the vagina.

[1] *The Journal of Pathology and Bacteriology*, October, 1923.

Abstracts from Current Medical Literature.

MEDICINE.

The Influence of Fat and Total Calories on Diabetes.

FREDERICK M. ALLEN (*The Journal of Metabolic Research*, January, 1923) states that the "Insulin" requirement of the organism is governed not only by carbo-hydrate, but also by fat and all other elements which enter into the diet or metabolism. It is uncertain whether "Insulin" is directly concerned in total metabolism or whether it is specifically related to the assimilation of glucose alone and only in some indirect way with the metabolism of other foods. It can only be said that the body cells somehow require "Insulin" for their nutrition and consume it at a rapid rate in their life processes. It is probably concerned with anabolism as much as with metabolism. The minimum "Insulin" requirement compatible with sugar freedom may be as low as four units *per diem* for a young child, but is probably twelve units or more for an adult. Yet any diet sufficient for the maintenance of life even on the lowest plane of nutrition probably requires a doubling of these figures. The need for "Insulin" is related quantitatively to the body mass as well as to the amount of food to be metabolized. A patient who gains weight as the result of an increase in his adipose tissue, has an increased need for "Insulin" not only during the building up of this new tissue, but also as long as the extra tissue is maintained. Hence it may be concluded that the internal secretion is used not only for the upbuilding of the body mass, but for its maintenance as well. This principle explains the tendency to diabetes exhibited by obese subjects and by those who live on large and luxurious diets. Hence the treatment in vogue for many years having for its purpose the maintenance of the patient in a condition of nutrition below the average rests on a sound foundation. Experiments showing the influence of fat, total calories and body weight on the "Insulin" requirement strengthen the theoretical position of the "under-nutrition treatment" on all sides. This treatment is justified when opposed to other dietary proposals. Moreover, the exact correspondence of the results obtained with "Insulin" to the former modifications of tolerance obtained by restriction of the diet supports the belief that "Insulin" is the true internal secretion of the pancreas and that diabetes is due solely to a deficiency of "Insulin."

The Influence of Carbo-hydrate and Protein on Diabetes.

JAMES W. SHERRILL (*The Journal of Metabolic Research*, January, 1923) maintains that carbo-hydrate has a stronger influence in the production of glycosuria than the caloric equivalent of any other kind of food. Protein ranks below preformed carbo-hydrate in ability to induce glycosuria when the substitution is made on a basis of either equal caloric value or theoretical glucose content. Though hypoglycæmia may be prevented by a diet containing very large quantities of protein, this influence is surprisingly feeble and by no means in proportion to the theoretical glucose value. The assumptions generally made that protein has a very powerful influence in the production of glycosuria are, therefore, contrary to fact. The author also disclaims adherence to the view that there is a constant scale of "Insulin" dosage for the assimilation of any given quantity of glucose. He insists that the ratio between grammes of glucose and units of "Insulin" varies widely not only in different patients, but also in the same patient under different conditions. The relationship between glycosuria and "Insulin" requirements is very largely governed by the total caloric value of the diet.

The Immunizing Function of Lymphatic Glands.

KENELM H. DIGBY (*The Lancet*, November 17, 1923) has advanced the view that the tonsils, Peyer's patches, the solitary lymph glands and the vermiform appendix should be grouped together as the sub-epithelial lymphatic glands; that they are continually ingesting the adjacent bacteria in the nasal and alimentary channels by a process of "phagotaxis" and that in all probability by this mechanism these sub-epithelial lymphatic glands are constantly immunizing the body against various infections. He maintains that the lymphocytes of all the sub-epithelial lymphatic glands, including the tonsils, are throughout life continuously emigrating through the overlying epithelium, engulfing bacteria and returning through the epithelium into the lymphoid tissue, which is constantly crowded with bacteria in health. He condemns, therefore, the reckless removal of tonsils in the absence of the strongest evidence that they are diseased to such an extent as to endanger the health of the individual and the equally reckless removal by surgeons of the *appendix vermiformis* during operations for gynæcological and other abdominal diseases processes. The old fallacy that the appendix is a vestigial relic was surely overthrown in 1919 as a result of studies in comparative anatomy and embryology. Moreover, the diagnosis of "chronic" appendicitis is frequently made on the scanty evidence of vague abdominal pain. Inflammation of the appendix should only be adjudged to be present when the patient suffers from an acute or sub-acute attack. An acceptance of the theory of the immunizing action of the appendix would positively contra-indicate promiscuous surgical interference. Enlargement of the naso-pharyngeal tonsil may obstruct nasal respiration with serious consequences, necessitating the help of surgery, but the fact that whitish material containing bacteria and phagocytes can be squeezed from the crypts of the faucial tonsils cannot be accepted as a criterion of morbidity. Carruthers has pointed out that such fluid can be squeezed out of the tonsils of healthy sheep and suggests that it be called "physiological pus." A constant encounter is being waged during life between bacteria and the lymphoid tissue of the sub-epithelial glands.

Malignant Disease of the Colon.

A. SACHS (*North-West Medicine*, December, 1923) published the results of his investigations in regard to malignant disease of the colon. Sarcomata occur in the large bowel, most often involving rectum and ileo-caecal regions; they are commonest between twenty and forty years of age. Anæmia, asthma, loss of weight, diarrhœa and hæmorrhage from the bowel are the usual symptoms; obstruction is less common than with carcinoma. Diagnosis is difficult except by exploration. Carcinoma of the colon grows less rapidly than sarcoma and metastases occur later. Lymph glands may become enlarged from infection even before metastasis occurs. Metastases occur in lymphatic glands, liver, omentum, peritoneum, lungs and brain. Ewing described seven varieties of carcinoma of the colon, the most frequent being *adenoma destruens*, a typical malignant adenoma; stenosing fibro-carcinoma and gelatinous adeno-carcinoma and carcinoma developing from solitary polyps in the rectum. Melanomata are rare. The sigmoid flexure and rectum are the commonest sites, but all parts of the large bowel are involved in any considerable series of cases. Carcinoma of the colon is commonest after forty, but does not occur in young adults. As aids to the diagnostic X-rays and rectal examination by the finger and with the proctoscope are the most important. The Wassermann test should always be applied. The diagnosis of carcinoma of the colon has to be made from colitis, pernicious anæmia, prostatitis, lumbago and sciatica, hæmorrhoids, actinomycosis, tuberculosis, *lues*, fæcal impaction, renal tumours and diverticulitis. Treatment of carcinoma of the colon is surgical. X-rays are less valuable for treatment than they are for carcinoma in other parts of the body.

Simple Goitre.

O. P. KIMBALL (*North-West Medicine*, December, 1923) discusses the prevention and treatment of simple goitre by the administration of very small doses of iodine. The use of this method has become more and more general during the last few years. In America, Switzerland and New Zealand the preventive administration is now widely employed in schools of goitrous districts. It is illuminating to study the gradual development of knowledge of the relationship be-

tween goitre and deficiency of iodine. In 1895 Baumann discovered that iodine was a normal constituent of the thyreoid gland, and in 1907 it was further proved that there was a definite relationship between the iodine content and the histological structure of the gland. Cellular hyperplasia and hypertropy were shown to be associated with a deficiency of iodine and the administration of iodine to animals with a hyperplastic thyreoid caused the gland to return to the colloid or resting state. If the iodine deficiency was not met the hyperplasia progressed to cellular degeneration and atrophy. The minimum amount of iodine necessary for the maintenance of normal gland structure has been shown to be about one milligramme per gramme of dried gland. The average iodine content of the human thyreoid gland is about two milligrammes per gramme of dried gland. In 1916 Kendall isolated the iodine containing element which he called thyreoxin, 65% of which consists of iodine. In 1909 and 1910 Marine and Lenhart eliminated endemic goitre from the Pennsylvania State hatcheries by the addition of minute amounts of iodine to food or water. In 1917 Marine and Kimball began to administer sodium iodide to the school children of Akron, Ohio. Two grammes of sodium iodide were given over a period of two weeks, twice a year. The result was an apparent decrease in the incidence of goitre and a diminution in size of existing goitres. This method of prophylaxis was adopted in parts of Switzerland in 1918 and good results have been repeated. Further trials are now being made in America, chocolate coated iodine tablets (ten milligrammes once a week throughout the year) being used instead of sodium iodide. The drinking water in goitrous districts has been proved to be deficient in iodine, but the addition of sodium iodide to the water supply was too expensive a method for extended use. There appears to be no doubt that a very small dose of iodine is all that is required. Large doses are harmful and tend to produce hyper-thyreoidism. Ten milligrammes daily during alternate months will give the maximum effect even in large goitres. The best preparation appears to be a chocolate iodine combination, "Iodostarine," composed of a vegetable fatty acid (tarric acid—di-iodide) and chocolate.

Non-Specific Asthma.

M. A. RANWIEZ (*New York Medical Journal and Medical Record*, June 30, 1923) states that patients with asthma may be divided into two groups, a specific group comprising those giving reaction to protein tests and a non-specific group comprising those who do not react to proteins. The latter group includes 60% of all cases of asthma. The author includes in this latter non-specific group those whose attacks are due to protein split products, the end products of protein digestion, chief among which is histamine. Under this heading he also includes those in whom chronic bronchitis occurs in association with asthmatic attacks, and those in whom chronic sinusitis, nasal polypi, infected tonsils *et cetera* are associated with asthma. Cardiac and renal disease, hypertension and chronic pulmonary tuberculosis should always be excluded. Complete protein tests should always be performed. The commonest proteins to which a reaction occurs are horse dandruff, goose feathers, rabbit hair, timothy grass, ragweed, corn, wheat, milk and egg white. Active immunization against pollens and animal emanations is satisfactory, but not against foods. Skin tests with bacterial proteins do not give positive results. In the treatment of non-specific asthma foci of infection should be attended to, deep breathing exercises undertaken and the vapour of some oily mixture inhaled several times. Intravenous injections of sodium iodide help to loosen the cough. Diathermy is a useful palliative measure if given for half to one hour three times a week. Hypodermic injections of 10% peptone solution in doses of 0.5 cubic centimetre daily for a week, subsequently increased to one cubic centimetre daily are useful. Patients should eat small quantities frequently and have only a light meal in the evening. They should rest for half an hour after each meal. The fæces should be examined for evidence of albumin putrefaction or carbo-hydrate fermentation and the diet sould be modified according to the findings.

Hepatic Lesions.

J. H. RYFFEL (*Journal of Clinical Research*, October, 1923) gives the results of his application of Van Den Bergh's test for bile in the blood to the serum of patients in whom hepatic lesions were suspected. Blood was drawn from a vein and the serum separated. To one cubic centimetre of serum 0.25 to one cubic centimetre of the reagent was added and a reddish or purple colour developed in a few minutes if bile was present in the blood. The reagent consisted of a 0.5% solution of sodium nitrite and a solution obtained by mixing 0.25 gramme of sulphanilic acid with 3.75 cubic centimetres of hydrochloric acid and adding water to 250 cubic centimetres (the sulphanilic acid was dissolved by heating in part of the water). To five cubic centimetres of the sulphanilic acid mixture 0.15 cubic centimetre of the sodium nitrite solution is added shortly before use. Another test consisted in mixing one cubic centimetre of serum with two cubic centimetres of 95% alcohol, the precipitate was removed by centrifugalizing and to one cubic centimetre of the clear supernatant fluid 0.25 cubic centimetre of the reagent was added. A reddish purple colour developes. Normal serum sometimes gives this reaction in some degree. The author found these tests of value mainly in recognizing the mild degrees of jaundice in which no bile appears in the urine and in the modified jaundice of hæmolytic anæmia, such as that of pernicious anæmia.

Hay Fever.

W. SCHEPPEGRELL (*New York Medical Journal and Medical Record*, June 20, 1923) classifies common hay fever plants and trees. He states that patients suffering from hay fever do not manifest absolute specificity to the pollen of only one plant or even of one group of plants. Thus 96% out of one thousand patients studied by him reacted to more than one group of pollens, *exempli gratia* grass, ragweed, chenopods. Further, patients who reacted to one grass pollen, also reacted to other grass pollens. The author used the intradermal method of testing this reaction. This method he considers more dependable than the cutaneous scarification method. In addition it was found that a patient who reacted to a number of pollens of grasses, need not be immunized against all these pollens, but that protection could be afforded by immunization against the commonest grass pollen in the neighbourhood of the patient. The same principle was applicable to other groups. For example, one ragweed protected against all ragweeds, but with trees it was necessary to immunize against the pollen of the particular tree to which the patient was sensitive. He divided all pollen into three groups: *Ambrosiaceæ* or ragweed, *Artemesia* or wormwood and *Gramineæ* or grass group. There were some minor groups which were much less common causes of hay fever and were mainly of local interest. The ragweed group comprised four main varieties: *Ambrosia elatior* or common ragweed, widespread and important; *Ambrosia trifida* or giant ragweed, in the eastern and southern States; *Ambrosia psilotachya* or western ragweed; and *Ambrosia bidentata* or lance-weed ragweed, on the prairies of the west and middle west. All these ragweeds pollinate between July and October. Patients can be immunized against all four by using an extract of one variety only, *exempli gratia* common ragweed. Iva or marsh elder and Xanthium or cockleburr are also included under the ragweed group. The wormwood group includes three main varieties which flourish mainly in the Pacific and Rocky Mountain States and pollinate mostly between July and October. The members of the grass group are mainly responsible for spring hay fever; they are less common causes of hay fever in America. In Europe they are the most frequent factor and ragweed and wormwood hay fever are unknown. Less common causes in America are *Chenopodiaceæ* or goosefoot family; runex, comprising docks and sorrels and belonging to *Polygonaceæ* or buckweed family; *Amaranthaceæ*, *Plantanaceæ* and trees. Of the last named oaks, poplars, ashes, junipers, cedars, walnuts and hickory are all occasional causes of hay fever, the pollinating season being mainly from March to June.

British Medical Association News.

SCIENTIFIC.

A MEETING OF THE NEW SOUTH WALES BRANCH OF THE BRITISH MEDICAL ASSOCIATION was held at the Psychiatric Clinic, Broughton Hall, near Sydney, on November 2, 1923, DR. C. H. E. LAWES, the PRESIDENT, in the chair.

Neurasthenia, Hysteria and Epilepsy.

PROFESSOR SIR JOHN MACPHERSON read notes of patients suffering from neurasthenia, hysteria and epilepsy and spoke on the differential diagnosis of these conditions (see page 201).

Early Arterio-Sclerosis.

DR. J. BOSTOCK read a paper on early arterio-sclerosis with psychoses (see page 203).

Complete Amnesia.

DR. S. EVAN JONES read notes of a patient, a male, aged thirty-six years, who had been taken to the Central Police Station on November 29, 1922, by a stranger who had found him in Hyde Park. He had given no account of himself and had been sent to the Reception House. Whilst there he had complained of pains in his head and feelings of dizziness, but could remember nothing of his previous history. He had been identified on December 5, but had not recognized his relatives and their presence had irritated him. On December 13 he had seen in the newspapers a reference to Bermondsey in England and he had suddenly recollected that he used to live there and certain details of his child life had returned.

He had been admitted to Broughton Hall on January 24, 1923. No further memories had returned. In the hypnotic state the patient had been instructed to think of Bermondsey and he had experienced vivid hallucinatory recollections of his early life. These he remembered afterwards. Treatment had been continued in this way. Under light hypnosis an idea had been presented to the patient which had called forth associated memories and these afterwards had been synthesized with what had been regained previously. A few memories had returned spontaneously.

An interesting feature of his case was the fact that he practically lived again the chief incidents of his life and as the memories returned he re-experienced the emotions which had previously been associated with the original incident. An example of this was the very acute depression which appeared when the memory of a love affair in which he had been jilted, returned. By the end of April all his memories had been restored and the motive for the amnesia had been disclosed. The patient had undertaken to buy a business on terms, but had failed in his payments and had tried to make money quickly by betting at the races. He had lost £100 borrowed from a brother-in-law in this way. He had seen no way of meeting his obligations and the amnesia had appeared as a solution of his conflict on the day he was to have met his brother-in-law to discuss the repayment of his loan. The case was interesting in that the symptoms appeared as the result of a conflict between duty and ambition and because of the complete absence of sexual motives.

Parkinson Syndrome Following Influenza.

Dr. S. Evan Jones next presented a patient, aged thirty-six years, who had had a severe attack of influenza in 1919. He had been delirious for several days. After this he had remained well until twelve months later when he had suffered from insomnia for a week and had then become somnolent during the day. This somnolence had lasted for two years and the patient had noticed that his memory had become defective for names. Five months before admission his arms had become stiff and "moved round in front of his body" when walking. His movements had become progressively slower, his voice weak and monotonous and there had been an excessive secretion of saliva.

On admission it had been found that the neck and trunk were flexed, the upper extremities adducted and the forearms held stiffly in front of the chest. The face was mask-like and when the patient smiled, the expression remained as if graven for a considerable time and then slowly faded. Speech was slow, the voice weak, high pitched and monotonous. There was inconstant diplopia on left lateral vision; winking movements were diminished, the pupils were unequal, reacted sluggishly to light and consensually, but were actively on convergence. All movements were slow and the finer individual movements of the fingers were lost. In walking the neck and trunk were bent forwards, the upper extremities was flexed in front of the trunk; associated swinging movements were absent.

The patient stated that sometimes during the performance of a movement with the right arm the limb became fixed before the action was completed; this had also been observed objectively. The striking feature about the patient was the loss of the fine, skilled movements of the fingers. An attempt had been made to re-educate him in this direction and there had been a slight improvement and on several occasions for a few minutes the power of movement had completely returned.

Dr. Evan Jones also presented a female patient, aged twenty-nine years, who had had an attack of influenza five years previously. During the convalescence she had had a generalized clonic convulsive seizure which had lasted for eighteen hours and had been arrested by the administration of chloroform. A week later diplopia and bilateral ptosis had appeared. These symptoms had lasted for several months and had gradually disappeared. About the same time her friends had noticed that the patient's facial expression became fixed. She had married two years after her illness and her one child was twelve months old at the time of admission. From the beginning of pregnancy the patient had noticed that she had walked slowly and that her arm and finger movements had become retarded. Tremors had appeared in the upper and lower extremities. The symptoms had become worse after confinement and the arms had felt stiff.

On admission there was a uniform enlargement of the thyreoid gland. The patient's attitude and gait were typical of the Parkinson syndrome, the neck and trunk being flexed and the arms held stiffly adducted and flexed. There were no associated movements of the upper extremities in walking. The facial expression was fixed and changed very little with varying emotional states. There were no sensory disturbances. The patient complained of polydipsia and excessive salivation.

Post-Encephalitic State.

Dr. Evan Jones showed a girl, aged nineteen years, who had had attacks of hysterical chorea when nine, twelve and fifteen years of age. Eighteen months previously her present illness had begun with pain in the right arm followed by delirium with pyrexia. The acute stage had lasted for five weeks and during this time diplopia had appeared. Since then the patient had been lethargic and somnolent.

At the time of admission the neck and trunk had been bent forwards, the right upper extremity, adducted and flexed at the elbow, had been held rigidly and had not swung when the patient walked, although the left arm had swung in a normal fashion.

Visual acuity had been greatly impaired; there had been an alternating divergent strabismus and a complete absence of conjugate convergent movements of the eyeballs, although the extrinsic ocular muscles had been intact. The pupillary reaction to light had been very sluggish and there had been no contraction when the patient had tried to accommodate for near vision. Nystagmus had been present in all directions. Skilled movements of the fingers had been performed slowly. *Flexibilitas cerea* had been present on the right side.

Progressive Lenticular Degeneration.

DR. A. T. EDWARDS exihibted a male patient, twenty-two years of age, who had always been mentally defective,

but on leaving school had earned his living for some time as a blacksmith's striker.

His mother stated that the illness had begun two years previously with difficulty in speaking and loss of use of the lower extremities.

When the patient had been admitted, the palpebral fissures were narrow, the ocular movements intact and the pupils reacted to light and on convergence. Speech had been slurring. The prominent symptoms had been motor. There had been great impairment of skilled movements of the fingers; the gait had been stilted, steps had been short and the right foot had tended to scrape the ground, but there had been no loss of power in any muscles. The abdominal and cremasteric reflexes had been brisk and the knee, ankle and triceps jerks exaggerated. The plantar reflex had been flexor.

Neither the serum nor the cerebro-spinal fluid had reacted to the Wassermann test. No other evidence of syphilis had been discovered. Since admission the patient's condition had become progressively worse and at the time of the meeting there was a gross involvement of speech and gait. Previously there had been a pronounced tendency to retropulsion and the patient had been unable to ascend stairs or to walk up a slight slope without assistance to prevent his falling backwards. On admission the speech had been slurred; then isolated aphasic symptoms had appeared, and it had become unintelligible.

Although the patient had these considerable motor disabilities there was no muscular wasting or weakness. There were no abnormal reflexes and the plantar reflex had always remained flexor. The chief features were the loss of the muscular coordinations required in speech, writing and walking associated with muscular rigidity and progressive mental deterioration. The diagnosis was not clear, but it seemed likely that the pathological lesion involved the extra-pyramidal motor system. The suggestion was made that the case was one of progressive lenticular degeneration.

Myoclonic-Algic Encephalitis.

Dr. Edwards presented a male patient, aged twenty-four years, who had been quite well till the end of August, 1923, when he had noticed stiffness and pain in the neck. The symptoms had become more intense, but he had continued his occupation as a timber getter for a week. The pains had extended to the shoulders and spine and had been aching in character and like the sensation from an electric battery. They had prevented the patient from sleeping. Some days after the appearance of the pains he had noticed tremor of the hands and later powerful jerking movements of his abdominal muscles. A state of delirium had set in with auditory and visual hallucinations and illusions.

The patient had been admitted a month after the onset of symptoms. He had been physically prostrated, very much wasted and still mildly delirious. There had been scabs round the nares and trophic blisters had been present on the palms. No abdominal signs had been detected in the heart or lungs. The urine had contained a large amount of indican, but no other abnormal constituent; there had been oliguria and dysuria. Priapism had been present and the patient had masturbated during his delirium. The patient had lain in bed with his head and neck flexed, his upper arms adducted and his forearms flexed over the sternum.

The pupils had reacted sluggishly to light and on convergence, but there had been no other ocular symptoms. All muscles had been much wasted and there had been powerful irregular clonic contraction chiefly involving the abdominal muscles. The limbs had been affected at times. The mechanical irritability of muscles had been greatly increased and drawing the finger tip over the insertion of the *pectoralis major* had produced fascicular contractions. The abdominal reflexes had been absent, the knee jerks had not been elicited and there had been no response to plantar stimulation.

Sensory disturbances had been chiefly subjective, but there had been anæsthesia of the sole of the right foot, hyperæsthesia of the right leg below the knee and analgesia on the dorsal aspect of the right upper extremity. The patient had complained very much of pains in the upper extremities and in the back; these had been aching and tingling in character, but the most distressing symptom had been a painful sensation of intense cold down the spine. There had been excessive sweating and *cutis anserina* over patchy areas of the forearms. The leucocyte count had been 15,000. The cerebro-spinal fluid had been normal.

MEDICO-POLITICAL.

WE have been requested by the Council of the Victorian Branch of the British Medical Association to publish the following letter addressed to the Secretary of the Victorian Branch by Dr. Alfred Cox, the Medical Secretary of the British Medical Association.

DEAR SIR: The Organization Committee and Council have given very careful consideration to the question raised in your letter to Mr. Ferris Scott of May 21, as to whether it would be possible to discontinue sending *The British Medical Journal* to certain senior members of the Association and those retired from practice and reduce in proportion the Association subscription payable by those members. In reply, I am instructed to say that it is regretted that it would not be possible to make such an arrangement.

Under Article 6 each member of the Association is entitled to all the privileges of membership, including that of receiving the journal and there are many grounds upon which it would be impossible to attempt to discriminate between one member and another and one class of members and another class of members of the Association or the amount of the subscription payable by them upon any system of various benefits to be given to different sections of members. A member of the profession is under the constitution of the Association either a member of the Association with full membership benefits or not a member at all.

The journal is, of course, only one of the advantages of membership of the Association, but from the financial point of view and the point of view of the stability of the Association, the journal is a very important factor. It is one of the very few medical journals whose circulation is fully disclosed to the world. Most medical journals would have great reluctance to disclose their circulation figures. The journal on the other hand is proud of them (the figure is now well over 29,000 copies a week). On the basis of its declared circulation there is a great demand inside and outside the profession for space in its advertisement columns and advertisements, as you know, are a valuable source of income and thus of financial stability. The enclosed slip will give you an idea of the rates which the journal is now able, in view of its great circulation, to obtain for its advertisements.

If an arrangement were thought of whereby some members would cease to receive the journal, the result would probably be that sooner or later and perhaps sooner than later, the journal would cease to occupy the high position which it at present holds from the point of view of the advertiser and, naturally, the revenue of the Association would suffer accordingly, with serious ultimate results to the financial stability of the Association. And the financial side is not the only one on which the Association would suffer. Its prestige is to a great extent bound up with its journal.

Then again, if a principle were introduced whereby members could be put in different categories with different subscriptions, according to the benefit or benefits which they would derive from membership of the Association, the result might be disastrous for the Association. For example, members might claim that they had no use for the medico-political activities of the Association and might demand that their subscriptions should be greatly reduced in respect of their willingness to forego such benefits or members might say that they never attended meetings nor wished to do so and claim to pay a reduced subscription on that ground. You will readily appreciate the possible dangers.

We of course have differential rates of subscription for various kinds of members based on the fact that some

of them, *exempli gratia* the service members who are travelling about and the oversea members because of distance are unable to take advantage of some of the facilities which are open to members at home. But in no case do we make the reduced subscription a reason for refraining from sending the journal.

Another reason why it is essential that every member should receive the journal, though it is perhaps not as cogent a one in the case of, say, a very elderly member, is that the journal is the official medium of communication between the central executive of the Association and the members throughout the world and thus it is very desirable that, even if for no other reason, every member should receive it. Our lawyers insist that from the legal point of view each member must have the organ which contains the official notices or in the alternative (a very expensive one) that we must send these notices by post to every member.

As a matter of fact, the Central Council of the Association attaches great importance, as do the branches and divisions everywhere, to the support of the more veteran members of the profession in the counsels of the Association. If any of its members ceased to have the journal sent them, the tendency certainly would be for them to lose touch with and interest in the actions of the Association and thereby for it to be deprived of the valuable help it derives from the experience and special knowledge of those members.

With good wishes for your colleagues and yourself for the new year.

Yours faithfully,

ALFRED COX,
Medical Secretary.

The British Medical Association,
Medical Department, 429, Strand, London, W.C.,
January 10, 1924.

NOMINATIONS AND ELECTIONS.

THE undermentioned has been nominated for election as a member of the New South Wales Branch of the British Medical Association:

CHARLTON, NOEL BENSON, M.B., Ch.M., 1918 (Univ. Sydney), Rushall, Pymble.

THE undermentioned have been elected members of the Victorian Branch of the British Medical Association:

HYLTON, REX, M.B., B.S., 1923 (Univ. Melbourne), Children's Hospital, Carlton.

SCHWARTZ, JOSEPH, M.B., B.S., 1923 (Univ. Melbourne), 368, Lygon Street, East Brunswick.

Medical Societies.

THE SYDNEY HOSPITAL CLINICAL SOCIETY.

A MEETING OF THE SYDNEY HOSPITAL CLINICAL SOCIETY was held in the Lecture Room at Sydney Hospital on February 14, 1924, DR. T. FIASCHI, D.S.O., the PRESIDENT, in the chair.

Median Paralysis.

DR. R. H. BRIDGE demonstrated a patient who had been shown at a previous meeting of the Society on August 30, 1923. This woman had received an incised wound in the anterior aspect of the right elbow joint six months previously. Following this injury there had been some loss of power in the right hand, but the most definite lesion had been anæsthesia of the fingers over the area supplied by the median nerve. Anæsthesia was still almost complete on the tips of the fingers and the patient had burned the index finger badly owing to this insensitiveness. During the discussion which followed, it was agreed that no operative procedure should be undertaken for at least four months.

Diverticulitis of the Pelvic Colon.

DR. H. S. STACY showed a male patient, aged fifty-one years, who had been admitted to Sydney Hospital on August 25, 1923, complaining of pain in the lower portion of the abdomen of nine months' duration. The patient had suffered from diarrhœa; the bowels had acted at intervals of about fifteen minutes. Tenesmus had been present. The stools had contained mucus, but no blood. There had been considerable loss of weight. The patient had suffered from syphilis thirty years previously; there had been no history of gonorrhœa or dysentery. There had been no family history of tuberculosis. Examination on admission to hospital had revealed a sallow, poorly nourished man. The urine had been foul, had contained pus and flatus. The serum submitted to the Wassermann test by the ice box method had failed to yield a reaction. Rectal examination had revealed the presence of a mass in the pelvis; no ulceration had been felt. It would have been very difficult to have undertaken stigmoidoscopic examination owing to the obstruction caused by the mass. Radiological examination had revealed great duodenal irritation and the presence of barium in the colon three weeks after the meal. Laparotomy had revealed the presence of a large solid mass apparently arising from the lower end of the pelvic colon, involving the base of the bladder and also adherent in the pelvis. The omentum had been firmly attached to the mass. A deep incision had been made into the mass, no pus or fluid had been obtained and a piece had been removed for microscopical examination. A report had subsequently been received to the effect that the mass had a fibro-cellular structure with no trace of malignant disease. Colostomy had been performed. Mercury and iodide of potassium had been administered. Within a few weeks of the operation no flatus had been passed with the urine and the condition of the bladder had improved as the result of lavage. On the day of demonstration the patient said that he felt much better since the operation. He had no abdominal pain, no diarrhœa and was passing mucus *per rectum* at night. The colostomy acted about three times in the twenty-four hours and was well protected with a rubber support. He had gained in weight. The urine was still turbid, but contained no flatus. Dr. Stacy said that he feared the patient had only been taking the anti-syphilitic treatment intermittently. Rectal examination of the mass failed to reveal any change in its condition and much mucus but no blood was passed after the examination. X-ray examination showed the barium enema to pass freely to the colostomy wound. Dr. Stacy was inclined to regard the condition as one of diverticulitis of the pelvic colon, the massive exudate was such as sometimes accompanied this condition. Mummery had stated that 75% of vesico-colic fistulæ were due to diverticulitis. In regard to treatment 75% of patients with diverticulitis died if left alone, generally from septic peritonitis. Mummery favoured colostomy with the performance of abdominal section twelve months or so later. In the Mayo Clinic the mortality from excision was 18.5%. Dr. Stacy did not feel disposed to undertake any further operation on this patient unless the mass became smaller. He would adopt Dr. Jamieson's suggestion and push anti-syphilitic treatment.

Epithelioma of the Mouth.

Dr. Stacy also showed a man, aged sixty-three years, who was admitted to hospital on July 7, 1923, complaining of ulceration of the mouth. About four months previously the patient had suffered from an attack of tonsilitis and a piece of bone from a chop had lacerated the gum at the site of the growth. From this time the ulcer had commenced to grow. The patient had had his teeth removed several weeks before admission. Inquiry into his previous history had failed to elicit a history of venereal disease, he had had several attacks of quinsy and had suffered from renal calculus. Examination at the time of admission had revealed a small ulcerated and somewhat indurated growth involving posterior portions

of the alveolar borders of the mandible and maxilla on the left side. The ulcer had been fixed to the deeper tissues. No glands had been palpable in the neck. With the exception of some cardiac dilatation the other systems had been normal. The patient's serum had not reacted to the Wassermann test. On July 10, 1923, diathermy had been applied to the ulcer. On July 24, 1923, diathermy had again been applied and the lymphatic glands in the submaxillary and carotid regions had been removed. Several of these had been moderately enlarged and on microscopical examination had been found to be invaded by epitheliomatous cells. On August 14, 1923, the site of the ulcer had been occupied by scar tissue. The wound in the neck had healed without any trouble. At the time of demonstration the patient was apparently well. He had no trouble in swallowing and no pain. His general condition was good. The scarring was plainly visible and there was no sign of recurrence. Dr. Stacy said that his indisposition to perform a cutting, radical operation in this instance was due to the high mortality that accompanied such conditions far back in the mouth. Particularly was this the case when there was some interference with swallowing, for the patients readily got bronchopneumonia and died. He said that whatever views might be held in regard to diathermy (he preferred excision in suitable cases), it was necessary to attack radically the lymphatic drainage area. In the instance described there had been no doubt about the diagnosis, as the microscopical examination of the glands proved. The patient would, of course, be kept under observation. He thought that a growth of longer duration and in a younger patient would not have proved so amenable to treatment.

Compound Fracture of the Humerus.

DR. GEORGE BELL, O.B.E., showed a male patient, aged twenty-three years, a dancing instructor, who had been admitted to hospital on November 23, 1923. He had fallen from a tram on that date and had sustained an injury to the elbow. A skiagram had been taken and Dr. W. Edwards had reported the presence of a "T" shaped fracture of the lower end of the humerus with forward displacement of the distal fragments. On November 24, 1923, the patient had been seen in consultation by Dr. Corlette and an attempt had been made to place the fragments in position by means of temporary traction on the epicondyles with Corlette's hooks. The limb had then been put up in plaster with the elbow at right angles and the forearm fully supinated. An opening had been made in the plaster to permit the dressing of the wound. A radiological examination had again been undertaken and the report had been to the effect that the communited fracture of the lower end of the humerus was in good position. This had been taken, however, from the lateral aspect. During the second week in December the plaster had been removed. Considerable angular deformity had been present and an antero-posterior skiagram had revealed wide separation of the lower fragments. The wound had by this time healed and no pyrexia had occurred, except for two days during an attack of acute tonsilitis. On December 12, 1923, the fragments had been reduced by open operation. A dorsal incision had been made. Difficulty had been experienced in manipulating the lower fragments into position. They had been fixed by means of a screw inserted transversely. The lower fragments had been kept in apposition by means of a Lane's plate and screws inserted into the shaft and the radial of the lower fragments. The limb had been put up in a posterior angular moulded plaster splint and later in an internal angular splint. On December 20, 1923, the fragments had been in good position. On December 27, 1923, the wound had healed and the patient had been discharged on January 2, 1924. On February 12, 1924, a skiagram had shown the fragments to be in excellent position and good callus to be present. At the time of demonstration the patient had almost complete power of extension of the elbow joint and could flex the joint sufficiently to touch his shoulder with the tips of his fingers.

Pellagra.

DR. C. E. CORLETTE showed a man of middle age who had been operated on for hydatid disease and had subsequently developed severe lienteric diarrhœa. This had caused loss of weight and weakness. Following a short exposure to sunlight the patient had developed an erythematous rash involving symmetrical areas on both cheeks and hands. The skin over these areas had become thickened and had peeled off in large flakes. The rash at the time of demonstration had persisted for some weeks. A diagnosis of pellagra had been made. The condition was due to a dietary deficiency associated with the severe diarrhœa. The diagnoses of *lupus erythematosus* and of *erythema solare* had been considered, but had been rejected on the grounds of sudden onset and too long duration respectively. The condition had improved under dietetic management.

Exophthalmos.

DR. J. M. GILL showed a young man who complained of protrusion of the eyeballs of eight months' duration. There had been no previous ill-health. In fact the patient felt perfectly well. There was no evidence of cerebral or pituitary tumour. The serum had not reacted to the Wassermann test. The fundi were normal. The pulse rate was normal and there was no tremor or other evidence of hyperthyreoidism. There had been no fever. Dr. Gill pointed out that both eyeballs were proptosed. The palpebral fissures were wider than normal and the conjunctivæ were injected. No other abnormalities were detected. He regarded the diagnosis as uncertain. Neoplasm and retro-sternal thyreoid enlargement with exophthalmos had been suggested, but there was no positive evidence in favour of either diagnosis.

Chylous Ascites.

DR. A. W. HOLMES À COURT showed a male patient, aged fifty-two years, who had effusions of yellowish white fluid into the peritoneal cavity and right pleural sac. There was a history of symptomless abdominal swelling of insidious onset which had been noticed by the patient six weeks previously. Examination of the blood had failed to reveal the presence of filaria. Skiagraphic examination of the thorax and abdomen had not yielded any additional information. On examination of the abdomen there was an indefinite sense of tumidity in the right iliac region. The ascitic fluid was truly chylous with a specific gravity of 1012, fat droplets on standing and a high protein content. Dr. Holmes à Court considered that the clinical evidence pointed to the obstruction of the thoracic or right lymphatic ducts high up in the thorax. Enlargement of mediastinal lymphatic glands either the result of malignant disease or other cause was regarded as the probable ætiological basis.

Parkinson's Syndrome.

DR. GEORGE WILLCOCKS, M.C., O.B.E., showed a girl, aged twenty-two years, who complained of stiffness, shakiness and slowness of movements of six months' duration. The onset had been gradual and there had been no preceding illness. At times during the preceding six months the patient had seen double, but this had only been transient. An operation for goitre had been performed just before the onset of these symptoms. There was no evidence of hyperthyreoidism. Examination of the patient revealed ptosis of the left eyeball and a mask-like face. There was tremor of the tongue and hands with considerable rigidity of the arms and legs especially on the left side. Movements were slow and the general attitude and gait suggestive of *paralysis agitans*. There was universal anæsthesia of the life side of the body extending eight centimetres across the middle line on to the right side. The reflexes were normal. No response had been obtained to the Wassermann test and no abnormality had been found on examination of the *fundus oculi*. The cerebro-spinal fluid was not abnormal. Dr. Willcocks said that the clinical picture suggested a slow process affecting the *globus pallidus* and a possible affection of the *crus cerebri* causing ptosis and hemi-anæsthesia on the left side. Encephalitis or a diffuse gliosis was the probable cause of the condition. The patient was too young and the onset too sudden for *paralysis agitans*. Further the diplopia and the ptosis excluded that disease. There was no evidence of cerebral tumour. The prognosis was bad in view of the rapid advance of the symptoms.

APR 10 1924

Correspondence.

"INSULIN" IN DIABETES.

SIR: In your issue of February 23, 1924, page 197, my notes on a case of diabetes treated with "Insulin," the last three lines should read: "While receiving twenty units of 'Insulin' a day the urine had remained sugar free and the blood sugar had been maintained at about 0.1% half an hour before meals and 0.25% after meals."

The next paragraph is all right, page 198: "The maximum effect," *et cetera*.

Incidentally this chap remained sugar free for some weeks, but is now nearly as bad as ever, "Insulin" having been omitted since December.

Yours, etc.,

GEORGE WILLCOCKS.

233, Macquarie Street, Sydney,
February 22, 1924.

Medical Appointments.

DR. R. E. MCCLELLAND (B.M.A.) has been appointed Government Medical Officer at Uralla, New South Wales.

* * * *

THE undermentioned have been appointed by the Board of Health of New South Wales as Inspectors under the *Cattle Slaughtering and Diseased Animals and Meat Act, 1902*: DR. A. J. PARK (B.M.A.), at Narrabri; DR. S. H. WEEDON (B.M.A.), at Wagga.

* * * *

DR. H. G. WALLACE has been appointed Medical Officer of Health, Hunter River Combined District, New South Wales.

* * * *

DR. ELSIE DALYELL (B.M.A.) has been appointed on probation as Assistant Microbiologist, Office of the Director-General of Public Health, New South Wales.

* * * *

DR. W. H. RIGBY (B.M.A.), has been appointed a Justice of the Peace for the Sussex Magisterial District, Western Australia.

* * * *

DR. R. J. STEVENSON has been appointed an Officer of Health in South Australia.

* * * *

THE undermentioned have been appointed Government Medical Officers in Queensland: DR. A. B. BROCKWAY (B.M.A.), at Redcliffe; DR. E. F. MCCARTHY, at Home Hill; DR. A. H. MURPHY, at Texas.

* * * *

THE undermentioned have been appointed District Medical Officers and Public Vaccinators in Western Australia: DR. D. BROWNE, at Bridgetown; DR. S. FINKELSTEIN (B.M.A.), at Trayning.

Books Received.

COLONIC THERAPY IN THE TREATMENT OF DISEASE, by O. Boto Schellberg; 1923. New York: American Institute of Medicine, Inc.; Royal 8vo., pp. 202, with 23 illustrations.

FIFTY YEARS OF MEDICAL PROGRESS, 1873-1922, by H. Drinkwater, M.D. (Edin.), M.R.C.S. (Eng.), F.R.S.E.; 1924. London: H. K. Lewis and Company, Limited; Crown 8vo., pp. 196, with 37 illustrations on 35 plates. Price: 10s. 6d. net.

Medical Appointments Vacant, etc.

FOR announcements of medical appointments vacant, assistants, *locum tenentes* sought, etc., see "Advertiser," page xviii.

BROKEN HILL AND DISTRICT HOSPITAL, NEW SOUTH WALES: Two Medical Officers.

ROYAL NORTH SHORE HOSPITAL OF SYDNEY: Medical Vacancies.

Medical Appointments: Important Notice.

MEDICAL practitioners are requested not to apply for any appointment referred to in the following table, without having first communicated with the Honorary Secretary of the Branch named in the first column, or with the Medical Secretary of the British Medical Association, 429, Strand, London, W.C.

BRANCH.	APPOINTMENTS.
NEW SOUTH WALES: Honorary Secretary, 30 - 34, Elizabeth Street, Sydney	Australian Natives' Association Ashfield and District Friendly Societies' Dispensary Balmain United Friendly Society's Dispensary Friendly Society Lodges at Casino Leichhardt and Petersham Dispensary Manchester Unity Oddfellows' Medical Institute, Elizabeth Street, Sydney Marrickville United Friendly Societies' Dispensary North Sydney United Friendly Societies People's Prudential Benefit Society Phœnix Mutual Provident Society
VICTORIA: Honorary Secretary, Medical Society Hall, East Melbourne	All Institutes or Medical Dispensaries Australian Prudential Association Proprietary, Limited Mutual National Provident Club National Provident Association
QUEENSLAND: Honorary Secretary, B.M.A. Building, Adelaide Street, Brisbane	Brisbane United Friendly Society Institute Stannary Hills Hospital
SOUTH AUSTRALIA: Honorary Secretary, 12, North Terrace, Adelaide	Contract Practice Appointments at Renmark Contract Practice Appointments in South Australia
WESTERN AUSTRALIA: Honorary Secretary, Saint George's Terrace, Perth	All Contract Practice Appointments in Western Australia
NEW ZEALAND (WELLINGTON DIVISION): Honorary Secretary, Wellington	Friendly Society Lodges, Wellington, New Zealand

Diary for the Month.

MAR. 4.—New South Wales Branch, B.M.A.: Ethics Committee.
MAR. 5.—Victorian Branch, B.M.A.: Branch.
MAR. 7.—Queensland Branch, B.M.A.: Branch.
MAR. 11.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
MAR. 12.—Central Northern Medical Association, New South Wales: Clinical Meeting.
MAR. 12.—New South Wales Branch, B.M.A.: Last day for nominations of Candidates to Council.
MAR. 12.—Tasmanian Branch, B.M.A.: Branch.
MAR. 13.—Brisbane Hospital for Sick Children: Clinical Meeting.
MAR. 14.—Queensland Branch, B.M.A.: Council.
MAR. 14.—South Australian Branch, B.M.A.: Branch.
MAR. 18.—New South Wales Branch, B.M.A.: Medical Politics Committee; Organization and Science Committee.
MAR. 19.—South Sydney Medical Association, New South Wales.

Editorial Notices.

MANUSCRIPTS forwarded to the office of this journal cannot under any circumstances be returned. Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary be stated.

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